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THE INDEPENDENT GUIDE TO PERSONAL COMPUTING APRIL 8, 1997 VOL. 16 NO. 7

Snapshot Printers

Five New Ways to Get
Beautiful Prints from Your
PC and Digital Camera

**Antivirus
Software**

**Uninstall
Utilities**

NETWORK EDITION

Antivirus Gateways

Keep Your Internet E-Mail
Free of Infection

**Diagnostic
Software**

**File-View
Utilities**

**Performance
Enhancers**

**Internet
Utilities**

**Off-Line
Browsers**

**Off-Line
Search**

**E-Mail
Encryption**

**Filtering
Software**

**Win 3.x & NT
Utilities**

**Network
Backup**

**OS/2
Utilities**

MAGAZINE

255 Software Tools Reviewed

THE 1997

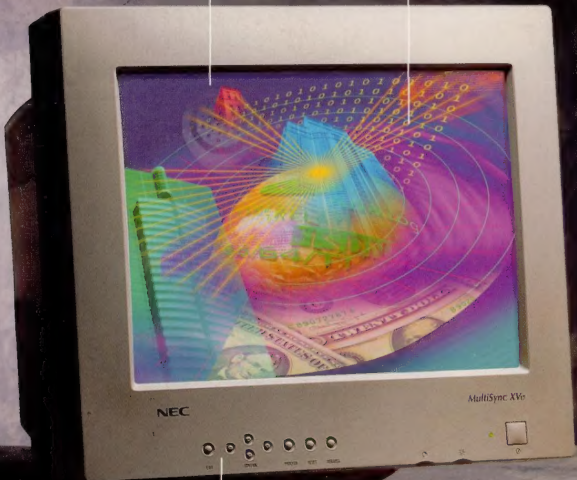
Ultimate
guide

"...bright screen, superior on-screen controls and low price."

Windows*

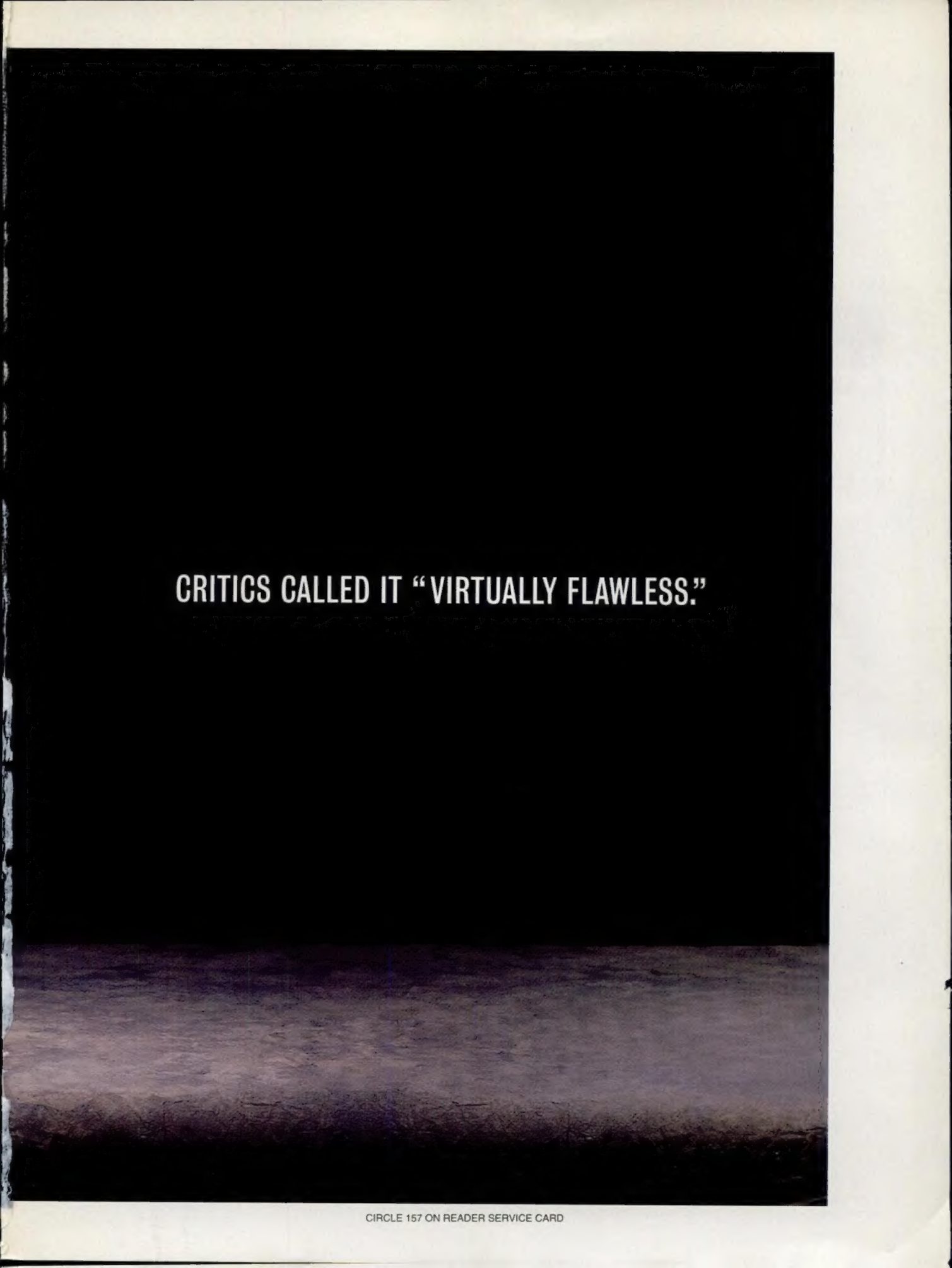
"...great picture quality, advanced features, and top-notch support... a superb monitor."

FamilyPC**



MacUser†

"A tremendous bargain, with great, easy-to-use controls."

A dark, atmospheric landscape. The upper portion is a solid black sky. The lower portion shows a textured, greyish-brown ground surface, possibly a beach or a field of sand, with some darker, shadowed areas. The overall mood is mysterious and dramatic.

CRITICS CALLED IT "VIRTUALLY FLAWLESS."



Inbox



Calendar



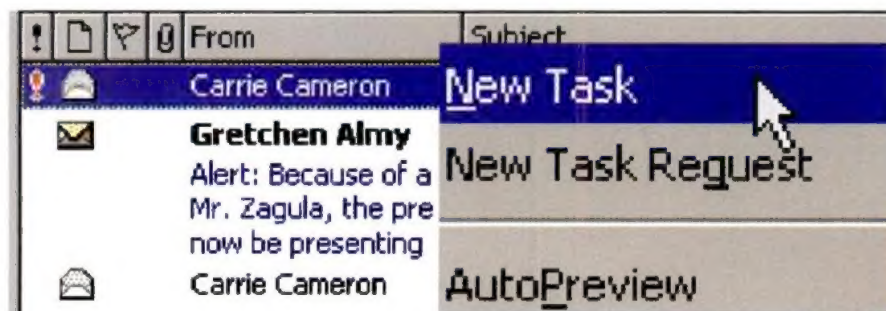
Journal



Tasks



Contacts



Microsoft Office 97/now/
it's going to be rea
to stay disorganized.



Address Book



Plan a Meeting

Goodman, Jae	10 ^{am}	☀ Production Meeting (5th floor conf)
E-mail: jae@wk.c	11 ⁰⁰	☀ "where we are headed" meeting (my office)
Lilly, Kim		
E-mail: kimlil@wk.c	12 ^{pm}	
Rotondo, Matt		☀ Lunch with client (TBD)
E-mail: mattr@wk.c	1 ⁰⁰	
Smith, Ken		Meeting with Lori Newman



Ily, really hard

Some people are inclined to neatly arrange, file, cross-reference and deploy strategic bits of information, like what's-his-name, the guy who sent you the e-mail about the thing on Tuesday...or Wednesday. Well, here's good news for the highly with-it and the chronically disorganized alike: the [new Microsoft® Outlook™ 97 desktop information manager](#). It's part of [new Microsoft Office 97](#), and it's here to help you get organized (or, as the case may be, way more organized). Outlook puts your [e-mail, electronic scheduling, "to-do" lists and contacts in one cozy interface](#). It helps you do smart things, like preview the first three lines of your e-mails to quickly separate news from junk. And you can easily [share, link and move information](#); for instance, drag an e-mail onto the contacts icon and a new contact file is automatically created for you. Now, that's functionality. Want to know more? Block out a little time to visit our Web site.

Where do you want to go today?® www.microsoft.com/office/

Microsoft®

50,000 Channels, 1 Desktop



"It's a war for eyeballs."

So said Andy Grove, Intel CEO, during Comdex last year. He was talking about the fight between PCs and television for the attention of consumers. After all, the more time people spend playing computer games or surfing the Internet, the less time they spend watching television.

But the "war for eyeballs" approach also applies to computer screens themselves. Lately it seems that just about every computer company wants to control your "desktop"—the way your computer screen looks while you are using it.

Right now, we're all familiar with the Windows desktop. That's typically the first thing we see when we start our computers and where we typically launch applications and manage files. It's an essential part of computing, but not something we think much about.

Meanwhile, over the past few months, a lot of companies have started talking about new software that sends you information over the Internet rather than your having to go find it. For example, the PointCast Network runs as a screen saver. And lately we've seen a number of new technologies designed to deliver information or even parts of programs in the background, such as BackWeb and Marimba's Castanet. This technology—called "push" technology, or "Webcasting"—has great potential to change the way we gather information. As I said in our February 18 issue, I expect that push technology will complement and work with the traditional Internet "surfing" (or "pull" technology).

But when you get all this information via push technology, where does it go? Some material, like updates to software, may well be in the background and invisible to you. But most of it needs to be in some very visible location—either your e-mail in-box (if you use e-mail a lot) or your desktop.

That's why software companies are scared by Microsoft's "Active Desktop" idea, which integrates its Internet Explorer desktop with the Windows desktop and push technology. It would give Microsoft the ability to determine which kinds of messages and channels

you see on your desktop.

Most companies I've contacted have reservations about this strategy. To combat it, several are creating desktops of their own. The most prominent is Netscape's Constellation, which would essentially make its browser the interface, and add file management and "push" content delivered via Castanet.

Suddenly, the desktop is the next software battleground, and everyone wants to get into the act. Sun plans to introduce its HotJava Views. A similar concept for its Java OS and HotJava browsers and also for some network computers is in the works. Others showing new desktops include Corel and Lotus.

This competition will likely result in new ideas for desktops, eventually producing a better user interface than what any one of the companies could have designed on its own. It also will spawn new ways to gather information.

And that's still the major question: whether there will be enough content—and more important, enough compelling content—to make push technology, Webcasting, and interactive desktops something we all care about.

Certainly we'll see a lot of news tickers, and those are useful. But beyond that, I'm not sure. Today, if you want, *PC Magazine* can deliver to you a newsletter updating what's on our Web site, or even a "channel" with interactive benchmark test results (if you're interested, register at www.pcmag.com/alert.htm).

I'm sure we'll have a lot to choose from, but I'm not sure it will be all that compelling. Will we end up with information that really makes us more productive, and "desktops" that are smart enough to understand what we want and to link us back to specific channel? Or will we just get too much data and not be able to get through it all? Will it just be 50,000 channels and nothing on?

Stay tuned.


MICHAEL J. MILLER

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IN FACT,
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AS OUR
COMPUTERS.

OUR
WORD.

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SPECIAL ISSUE

The 1997 Utility



BY GAIL SHAFFER It's baackkk! The *PC Magazine* utilities blowout, this year featuring more than 250 utilities to improve every facet of your computing experience. We've got lots of newcomers, especially for all those new Internet tasks100

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ONLINE



What's New On-Line

Utility Shortcut

Why not take the fastest route to many of the utilities we evaluate in this issue's cover story? Join us online at www.pcmag.com, where we've built a special download page that will give you one-click access to the utilities you can get directly from the Web.

ities we evaluate in this issue's cover story? Join us online at www.pcmag.com, where we've built a special download page that will give you one-click access to the utilities you can get directly from the Web.

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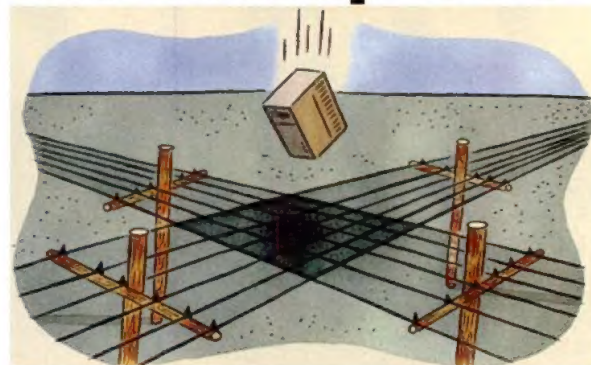
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Guide



PC TECH

Web Backup Tools



BY DAVID HASKIN You know the drill: Regularly scheduled backups are a good idea. And you know the standard approaches—backing up servers and client PCs locally. But do you know that the Internet opens up new options? Consider backing up your data off-site over the Internet, either through one of the new services or using one of the new packages designed expressly for this purpose. We review the players in each market263

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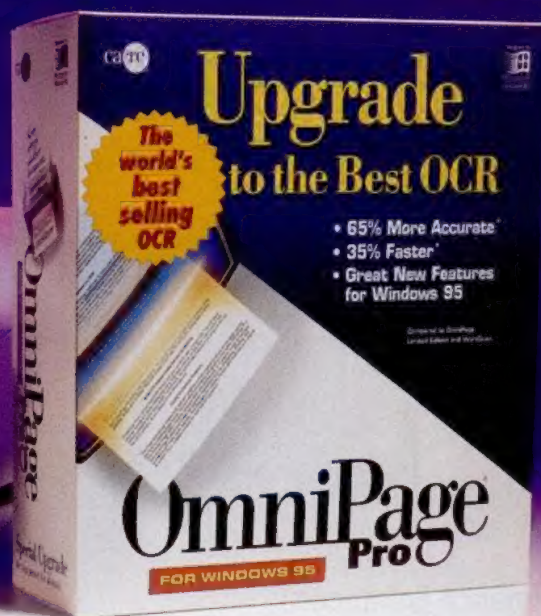
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OCR'S NEW DYNAMIC DUO



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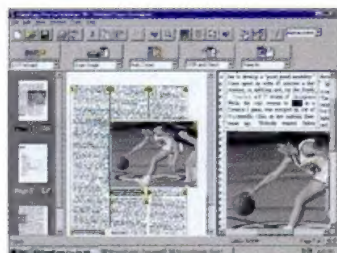
Who wants to retype documents or articles into their computer? Nobody. Which is why Hewlett Packard's all-new ScanJet™ 5p color/grayscale scanner has teamed up with Caere's OmniPage Pro®, the world's top OCR (Optical Character Recognition) software.

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Pipeline

Wired Wheels

Your next car may be wired to the Web, if Helmut Werner, chairman of the board of Mercedes-Benz, and Louis Gerstner, chairman and CEO of IBM, have anything to say about it.

The two executives have brought their companies together to develop a new generation of automotive electronics. Plans include outfitting cars with Global Positioning Satellite (GPS) receivers to make navigating congested city streets and highways less of a nightmare.

Gerstner described the car of the future as "a continuously modifying device" and "a mobile

area network" that will respond to dozens of sensors placed throughout it. The new network

computing architecture the two companies are devising will monitor and control the lights, engine, and climate control as well as collect information to help drivers react

quickly to changing weather and road conditions.

The newfangled cars will be able to plot the best routes by listening to GPS signals and running location data through onboard mapping software. In the future, drivers may link to the Internet for business information, directions, traffic reports, and e-mail.



Advertising Without Schmoozing

Somewhere an ad agency is planning a campaign to sell golf equipment. And somewhere a small Web site devoted to golf wants to sell ads but can't get the word out. How will these people meet? Chances are it won't be over a three-martini lunch.

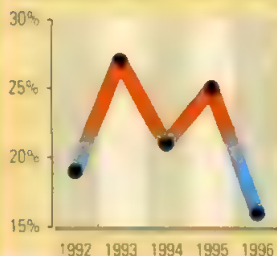
ADSmart Corp. (www.adsmart.net) of Andover, Massachusetts, is setting up an advertising marketplace on the Web to bring

together ad agencies looking for locations to place ads and Web sites that need to sell ad space to stay alive. By making the service free to agencies and by categorizing the Web sites that sign up (also for free) in all the right ways, ADSmart, which takes a commission on ad sales, lets agencies find cost-effective ways to place their ads in just the right places with almost no human interaction.

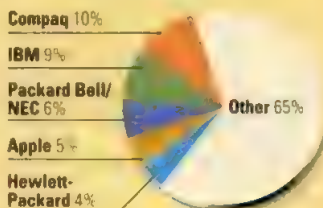
PC Sales: Growth Slows

With Compaq continuing to hold the lead, growth in worldwide sales of PCs in 1996 was moderate compared with 1995, when the release of Microsoft Windows 95 and the emergence of the Internet helped attract a large number of buyers

WORLDWIDE GROWTH RATE FOR PCs



1996 PC MARKET SHARE



Source: International Data Corp



"The toughest problem of all in computer science, much tougher than making a computer hear or see, is making a computer that learns. Consider the scientists who are sequencing DNA and learning about how human systems work: Eventually what we'll do is simply take those algorithms and transfer them from carbon into silicon."

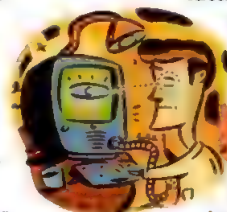
—Microsoft CEO Bill Gates, speaking to the American Association for the Advancement of Science

Biological Security

Protecting sensitive computer files from trespassers is moving way beyond the use of passwords, which can be cracked or stolen. Developers are turning to more reliable approaches based on *biometrics*—the identification of individuals based on their finger, hand, voice, retinal, and even vein prints.

Oracle recently launched a fingerprint identification device, manufactured by Identix, that's designed to control access to databases. Other companies are developing more

unusual biometric security systems. U.K. firm BTG holds the patent on technology to identify individuals based on the blood vessel patterns in the back of the hand. A facial expression system employs an infrared camera to identify heat spots, also known as *vascular tattoos*, that are created by veins and arteries in the face. Other systems measure hand geometry and analyze sweat pores on the fingertip. Researchers reportedly are also working on security systems that detect an individual's unique body odor. Lovely.



Online: Essential Extras

www.pcmag.com

Join us online for further discussion of the dozens of utilities evaluated in this issue's cover story, and head for our special download page, where you'll have instant access to many of the tools that we've profiled. **ARE YOU AN INTERNET USER?** Of course you are, and you'll be a better one if you stop in at www.internetuser.com for a daily dose of Web knowledge. On Monday, it's the Product of the Week. Tuesday brings the Developer Site of the Week. On Wednesday, the Internet Toolkit tells you where to learn more about specific Web topics. And every Thursday we present a new Internet product roundup.

ALSO ON THE WEB. Be sure to check in with weekly commentators John C. Dvorak, Michael J. Miller, and Don Willmott for interesting gossip, answers to your questions, and opinions about life on the Internet. And be sure to talk back. Our discussion forums are waiting for your comments.

Pipeline

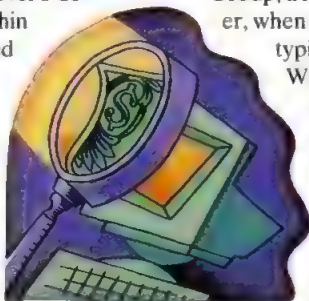
Can NCs Cut Costs?

Until network computers truly arrive, it will be hard to know whether the projections about their cost savings over PCs are realistic. The thin clients are designed to lower the cost of computing by eliminating hard disks and reducing support expenses.

But some critics claim that the "less is more" scenario doesn't work: Higher costs on the server side, resulting from a more active network, could eliminate savings on the client side. Furthermore, a recent Computer Intelligence survey of over 300 technology decision makers reveals that 51 percent of respondents have never heard of

a network computer.

According to data from market research firm Gartner Group, a network computer, when compared with a typical corporate Windows machine, can indeed save companies money. According to its calculations, a corporate Windows 95-based system costs \$9,784 a year to maintain. Sun's Java-Station runs \$6,010 a year—39 percent less expensive than a Windows machine. Gartner Group also estimates that the NetPC from Microsoft and Intel will cost \$7,267 a year in upkeep and offer an annual savings of 26 percent over a Windows 95 machine.



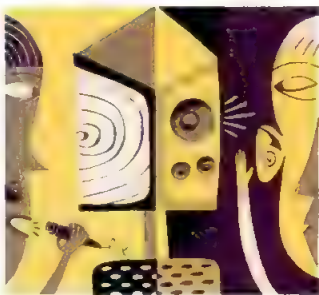
On the Web, Voices Carry

How would you send an apple pie over the Internet? To squeeze it through the narrow lines, you'd have to compress it. Perhaps you could freeze-dry it and then rehydrate it when it arrives. But maybe it would be better to analyze the pie's ingredients and send the recipe instead of the whole pie.

The recipe approach, explains Michael Goldstein, CEO of Princeton, NJ-based Voxware, is the better way for software developers to transmit voice over the Web without being forced to choose between sending a small amount of high-quality speech or a large amount of low-quality speech. Voxware's fast and compact codecs (coder/decoders) are helping to reinvent computer games for the Web—so players can plot strategies and tactics together—as well as giving developers clever new ways to control

characters' voices. By first modeling the voice, Voxware software can transform vocal characteristics such as pitch, speed, and resonance.

Voxware engineers are now focusing on improving the quality of voice over the Internet for business applications and doing it over connections as skimpy as



2,400 bps. The company recently partnered with telecommunications company Interliant to develop telephony applications that, Goldstein says, "will make Internet Protocol-based telephony a competitive alternative to today's public switched telephone network."

THIS ISSUE'S CONTRIBUTORS: Angela Hickman, Carol Levin, Sebastian Ruple, and Don Willmott.

Plug and Pay Up

Several companies are developing so-called "smart cards"—credit card-like devices with embedded microchips—that you can use for shopping over the Internet. The card will slip into a smart-card reader that's standalone or installed in a keyboard. Call it Plug and Pay.



DIGITAL CASH: KeyTronic is working with VeriFone on a keyboard-based smart card reader for downloading electronic cash.

So far, the smart cards are in use mostly in Europe. In Britain, Visa is testing its "electronic purse" card for Internet purchases. And in France, the Banque Nationale de Paris, Société Générale, Visa, France Télécom, and Gemplus are working together to develop a secure way to purchase goods and services over the Internet by using smart cards.

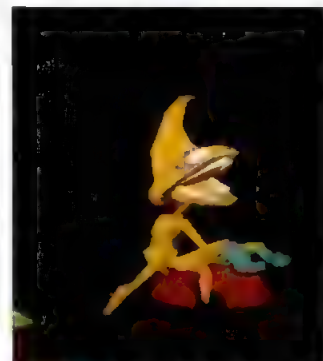
In the United States, VeriFone recently demonstrated its Personal ATM system, which is designed to download virtual cash from your bank account onto a smart card that you slip into a card reader.

VR Beyond Chat Rooms

VRML, or Virtual Reality Modeling Language, is heading beyond online chat rooms. Since the release of the VRML 2.0 specification, some brand-new kinds of virtual reality-based sites have started to appear on the Web. And the use of VRML browsers is on the rise.

At San Francisco's recent World Movers conference, Silicon Graphics and Netscape announced a partnership to make Silicon Graphics' Cosmo Player VRML browser part of Netscape's upcoming Communicator software. "We hope to bring VRML viewing to tens of millions of users," said John McCrea of Silicon Graphics.

At the conference's awards ceremony, Protozoa (www.protozoa.com), which translates live-motion video into animations, won for best VRML site.



WEB 'TOON: Floops is the character who helped Protozoa win Silicon Graphics' VRML award.

Top-Selling Retail CD-ROMs

- 1 **Myst** Broderbund
- 2 **Command & Conquer Red Alert** Virgin
- 3 **Microsoft Flight Simulator** Microsoft
- 4 **101 Dalmations Story Book** Disney
- 5 **Microsoft Windows 95 Upgrade** Microsoft
- 6 **Madden Football '97** Electronic Arts
- 7 **Toy Story Activity Center** Disney
- 8 **Print Shop Deluxe III** Broderbund
- 9 **Barbie Fashion Designer** Mattel
- 10 **Quake** Id Software

SOURCE: PC DATA. DATA FOR DECEMBER 1996.



Monday:

Find that expense report from 1993 (the one with the little white lie in it).

Wednesday:

Search through records to find receipts justifying expenses. Stand in line to use the fax machine. Curse the AP department.

Thursday:

Spend six precious hours retyping budget proposals that will probably get rejected, anyway

TODAY:

Buy PaperPort Deluxe Software and save up to \$40 on a Visioneer PaperPort or Microtek ScanMaker® scanner!

Tuesday:

Sort through 1996 paperwork. File some documents. Photocopy others. Recycle the originals. Repeat process until desk is recognizable

Friday:

Organize marketing research, memos, and sales projections by client, product, and quarter.

Weekend:

Find, retype, and e-mail that newspaper article about the competition to the sales team—in France.

Monday, again:

Fax this batch to the boss, his boss, her V.P., and the entire corporate marketing department

A new day is unfolding.

Introducing PaperPort Deluxe Software

It used to be hard to tell where you left off and your messy desk began. Not anymore. Thanks to a new invention called PaperPort Deluxe™ Software, your scanner can now help you tackle the paper that pervades your life. Use ScanDirect™ to scan stuff—even color stuff—directly into your favorite applications. Use FormTyper™ to scan in and fill out forms. File paper into folders up to 5 levels deep. Then find things using SimpleSearch™. Xerox TextBridge™ OCR software is included for easy editing. And PaperPort Deluxe is Windows 95- and NT-certified, to boot.



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The Mac OS. *It does. It will.* *YOU CAN.*

At Apple, we started with one simple goal: to make it easier to do the things you want to do. Over the years, the Macintosh® operating system has helped millions of people do just that, by providing a simple, intuitive approach that makes all aspects of computing easier. But even more impressive than what a Macintosh can help you do today is what it will help you do tomorrow.

It does more than ever.

So what does the future of the Mac OS look like? For a glimpse, check out our newly released Mac OS 7.6. It's faster than ever before—so you can start your Mac, launch applications, save files and print up to 40% faster.



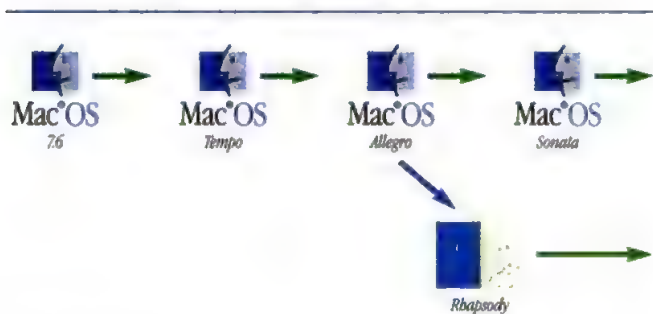
The Mac you buy today won't be obsolete tomorrow. Because Rhapsody will be compatible with all currently shipping Mac OS systems.

Connecting to the Internet is easier too. With the latest version of the Apple® Internet Connection Kit (it includes Netscape Navigator™ 3.0 and other Internet tools), you're one step away from accessing the Net. Or, if you prefer, you can use AOL or our own Apple Cyberdog™—they're included with Mac OS 7.6 along with TCP/IP and PPP.

Mac OS also has the latest version of Apple QuickTime®, the industry standard for multimedia creation and delivery. And it makes upgrading easier: with one CD-ROM and a streamlined installation process.

Intrigued? Then you'll love what comes next. Because we're hard at work on the next version of the Mac OS, code-named Tempo. Right from the start you'll notice a new look, with beveled buttons, icon drop shadows and other 3-D enhancements to the desktop. Tempo will dramatically improve system responsiveness by incorporating multitasking, multi-threaded functionality and native PowerPC™ capabilities directly in the OS. So you can run multiple applications more smoothly, and launch new applications while files are copying in the background. Tempo extends our Internet capabilities with easy

The Mac OS Report. One in a Series.



Apple's complementary operating systems—Mac OS and Rhapsody—allow you to choose the system that best meets your needs. They also allow you to decide when it's time to make the transition.

setup, personal web sharing and built-in Java™. And it will help you be more organized, by reducing on-screen clutter with spring-loaded folders and pop-up windows for frequently used items.

Of course, Tempo also paves the way for further updates to the Mac OS. Because there's much more to come.

It will be the NeXT thing.

When we began defining a new software architecture that would take us into the future, we had two clear objectives: to enhance our traditional strengths, and to create an operating system that would leapfrog the competition, setting standards into the next century.

Enter NeXT.™ By acquiring NeXT Software and adopting their kernel-based architecture, Apple can offer advanced system services such as true multitasking, protected memory and symmetrical multiprocessing. We have also strengthened our position in client-server and Internet/Intranet markets. And NeXT's object-oriented development environment and powerful tools such as WebObjects™ and Enterprise Objects Framework™ give us clear advantages in the creation of new solutions.

Merging NeXT and the Mac OS will create a next-generation OS that will give our competitors something new to catch up to. It will be an OS that helps developers create breakthrough applications by allowing greater experimentation and efficient reuse of code. It will include the best of our graphics technologies, such as ColorSync® and QuickDraw® GX. And we plan to adopt the Adobe® PostScript® imaging model as well. It will fully support the QuickTime Media Layer. It will provide industrial-strength reliability, performance and ease of use. And it will be an ideal platform for publishing, multimedia and Internet applications yet to come.

What is the name of this new OS? Its code name is Rhapsody.

It will be an Apple thing.

Rhapsody will leave other operating systems in the dust. But not Apple customers. To start with, Rhapsody will enhance the general look and feel of today's Mac OS interface. It will support all currently shipping Mac OS-based systems. It will run the vast majority of existing Mac OS applications by hosting the complete Mac OS on the Rhapsody kernel.

In short, Rhapsody will run your existing applications and utilities, read your files, recognize your current fonts and extensions and play your movies and sounds. Rhapsody will deliver the kind of technology you expect from Apple. The kind of technology that appeals to anyone who requires the highest performance for publishing, Internet and multimedia authoring, and scientific and technical work. The kind of technology that appeals to people who like to, well, get things done.

You can.

What does all this mean? It means you can do everything you're used to doing now, plus a few things you might not yet imagine. It means you can buy a Mac today and not worry about its compatibility with Rhapsody tomorrow. It means Rhapsody won't just be a new way to use a *Macintosh*—it will define an entirely new way to use *computers*. You can learn more by visiting us at www.macos.apple.com or by calling 800-538-9696 for information by fax.



Mac OS

The world's most intuitive and easy-to-use operating system will remain just that. With regular system updates and enhancements, the Mac OS will take you well into the future.



The acquisition of NeXT provides Apple with additional strengths in performance, reliability, network management and rapid application development.



Mac OS 7.6 extends Apple's leadership in graphics and multimedia by bringing together the latest versions of Apple QuickTime technologies, collectively known as the QuickTime Media Layer.



Adobe PostScript

Apple intends to adopt the Adobe® PostScript® imaging model for Rhapsody and transfer the best of our existing graphic technologies, including ColorSync and QuickDraw GX.



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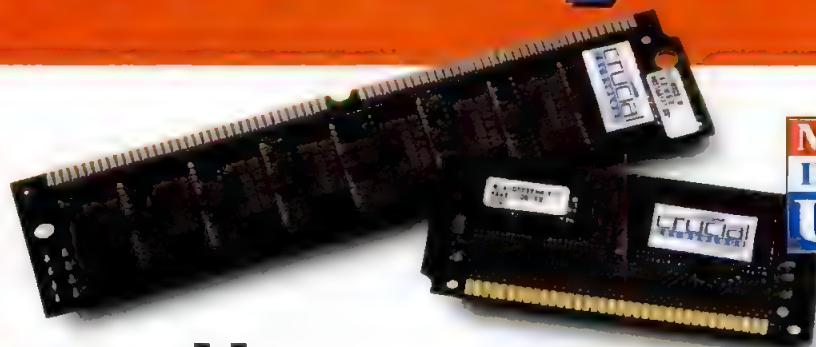
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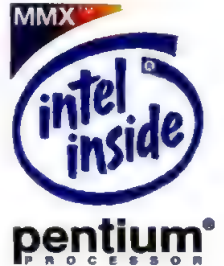
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Letters

MUSINGS ABOUT NCs

I read with amusement yet another article from an industry pundit whose reaction to network computers is one of fear, uncertainty, and doubt ("Fight the Power! Fight the Power!", January 21, 1997, page 30). First of all, Jake Kirchner portrays those of us in information technology as thugs, with an ignorant desire to crush freedom and repress PC users everywhere. The target market of the NC is not people like him who are power users and love their PCs, but millions of people who want to do their jobs quickly and efficiently—and don't care how fast their processors are or how much RAM their video cards have. Kirchner also forgets the millions of possible locations where the NC would excel, such as libraries, museums, and schools.

JERRY FOSTER
Oxford, Mississippi

I was offended by Kirchner's column. His repeated Nazi references, when mentioning companies such as IBM, were insulting to the many fine people who work for or manage those companies.

JOSEPH KIMBRO
via the Internet

I think I need to remind Kirchner that corporate PCs are not the personal playthings of employees. They are, rather, tools in service to goals of the company.

GERRY ALLEN
via the Internet

Kirchner's rantings against the NC and the "IT gestapo" sound more than a little paranoid. For some reason, the industry has become hysterically fearful that anything that might not favor the Wintel hegemony constitutes a "return to dumb terminals." The NC is defined by Sun (and others) as any computer hooked to a network. That means you can have a hard disk and a CD-ROM drive. The big difference that Sun espouses is using diskless workstations for the places that don't need anything more and using Java to create the applications—even the multimedia ones.

GILBERT PILI
via the Internet

I couldn't figure out whether Kirchner was joking or not. To polarize the issue and make it the NC versus the PC is ludicrous. Comparing the NC with the PC is like comparing a Chevy with an F16 jet. In my day-to-day life I need the flexibility and compatibility of a Chevy, but a fighter pilot should probably choose the jet.

MIKE HIATT
via the Internet



*To polarize the issue
and make it the NC versus
the PC is ludicrous.*

"Fight the Power! Fight the Power!" was a thought-provoking article. I feel computing is at a crossroads. Corporate computing has supported the PC industry for a long time. The home PC industry needs to have businesses continue purchasing PCs to keep prices low. If the PC industry can show business customers that it is more cost-effective and productive to use PCs, they will. If not, watch out.

JAMES CANNON
via the Internet

Now that the NC is starting to make sense to corporate America, Kirchner sees some sort of "evil empire" conspiracy to limit his computing experience. Sorry, but if it makes economic sense and delivers the goods, what's the problem? Nobody's going to take your multimedia PC away if it is necessary to accomplish your job.

RAY KAMPA
Colorado Springs, Colorado

Kirchner has apparently reduced the arguments of NCs to the extremes: The IT world will be controlled by either free PC users or mainframe zealots. He has removed the vast middle ground, which is where the future of the NC and the PC will likely be decided.

RON DIVECCHIA
Peabody, Massachusetts

Thanks for your reasoned and tough defense of the PC over the NC. They'll never get my

PC away from me. I just switched to Windows NT 4.0 and absolutely love it.

CHUCK HUMBLE
via the Internet

STILL THINKING ABOUT NCs

Jim Seymour's column in the January 21, 1997, issue ("How to Think About NCs") hits the nail on the head. NCs will not replace PCs but will complement them. It all comes down to what you really need on the desktop. So the NC has its place, as does the PC.

RICH NEVES
New York, New York

NCs AND JAVA

In "The Decline of Desktop Computing" (January 21, 1997), John C. Dvorak has shown that he can think clearly and see things with unclouded eyes. I worked in an office with 25 employees where each desktop had a PC. I saw no need for this because everyone saved their work on the network, and e-mail was located on the server as well. Problems arose when a few computers were upgraded to a later version of a given application. Most of my colleagues neither understood nor wanted to understand all the problems we were having with file incompatibility. Network computers certainly seem to make sense in the corporate world.

MARK WILLIAMS
via the Internet

As a PC network administrator, I'm often fighting off managers in my company when they come at me with incomprehensible buzzwords. I frequently rely on Dvorak's unfettered opinions to set them straight, but this time he is acting like one of those managers. Java is great; we need a true multiplatform environment. But the idea that Java is somehow going to take over the corporate network is ludicrous. The corporate world does not want to go back to the mainframe, or anything like it.

BOLTON K. WINPENNY
New York, New York

Dvorak ends his column with the idea that "What will emerge... will be two distinct tracks of computer development: thin clients at work and personal computers at home." It seems that he bases this outcome on the emergence of Java. I don't believe that Java and thin clients will end the desktop war; instead, they will merely provide another stepping stone in the way corporate America develops computing. I'm sure some engineer is thinking of another way of performing cross-platform development.

RICK CARLSON
via the Internet



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Letters

OS/2 ALIVE AND WELL

Thank you for your recent excellent coverage of OS/2 and native OS/2 software. I switched to OS/2 one year ago and can't believe how much I love it. It has really rekindled my interest in computing and programming for the first time since high school, which was over ten years ago. I was saddened by the departure of *OS/2 Magazine* and will really miss it. I believe your coverage of OS/2 is probably less biased than that of any other major computer magazine, despite what OS/2 advocates on the Internet may say.

DAN EVANKO
via the Internet

MISSING JAVA TOOLS

I read your article "Java Tools Get Real" (January 7, 1997) with interest but was puzzled by your failure to mention Silicon Graphics International's Cosmo Code 2.0 in any section of the article. We have been working with this product for some time now and find it to be very good.

TRACY L. WILSON
Buenos Aires, Argentina

Cosmo Code is indeed a visual Java programming environment, but it is intended exclusively for Silicon Graphics' version of Unix (called IRIX). The focus of the story was on software for PCs, not proprietary versions of Unix.—Ed.

A PLETHORA OF OPTIONS

I just read Bill Machrone's column in the January 21, 1997, issue ("Needed: Client/Server Telephony") and couldn't agree more with him. I have had similar dreams of a slightly

HOW TO CONTACT US

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CORRECTIONS AND AMPLIFICATIONS

In the Inside Track for February 4, 1997, John C. Dvorak says that the K6 processor is "30 percent as fast as" the Pentium Pro. That should have read "30 percent faster than."

In the cover story of our January 21, 1997, issue ("Affordable, Portable Notebook PCs"), we stated that the Micro Express NP133B has a travel weight of 8 pounds. In fact, the unit has a travel weight of 9.1 pounds; the system by itself weighs 8 pounds.

In our January 21, 1997, First Looks article "Pocket Windows," we incorrectly cited one of our benchmark tests as a Spell-Check test, when in fact we tested with Pocket Word's Find feature.

In the Ask Our Advisors section of PC Solutions in the January 21, 1997, issue ("Fixing Forms," page 224), we incorrectly stated that you can't enter an Escape character using certain editors. However, you can enter an Escape character in DOS Edit by pressing Ctrl-P and then Escape.

In the January 21, 1997, Second Looks article "A Couch Spud's Dream," David Bamundo should have been credited for the illustration.

smarter "client," which would solve problems for us poor end users who have to remember (and list) many different numbers—in my case, for two lines at home, a pager, a cell phone, and a fax machine.

DAVID HARRIS
Oakland, California

EASY MONEY

I read your comparison of Microsoft Money 97 and Quicken Deluxe in your January 21, 1997, issue ("Making Your Money Make Money"). You failed to address one major point about Money 97: its inability to work properly with certain modems. I have had Money for Windows 95 for some time now and was eager to upgrade to Money 97 after reading many positive comments. Everything worked well until I tried to connect in order to do my online banking. I use a U.S. Robotics Winmodem 28.8 with the 33.6-Kbps upgrade, which will not work with Money. Had I known this in advance, I would have opted not to spend my money on Money until the problem was corrected.

AUTRY HAWS
Boise, Idaho

I was very disappointed in your review of personal finance packages in the issue of January 21, 1997. Other categories of software, notably recent upgrades of word processors and spreadsheets, have managed to add significant ease-of-use features that empower novice users while retaining the full capabilities that expert users value. But with Quicken, by contrast, the approach for the last several years has been to dumb down the program to suit new users while removing numerous capabilities deemed essential by veterans.

TERRY REIGEL
via the Internet

None of the software you reviewed will tell me the rate of return, annualized return, and

return on investment for stock that I own. Surprisingly, the one package that does this is Mecca's Managing Your Money 12.0 for DOS.

ALAN KOSLOW
Northbrook, Illinois

BULL'S-EYE

In the January 21, 1997, issue, the PC Tech/Operating Systems article "Fast as a Dart: OS/2's Direct Audio Routines" hit the mark pretty close to what I had hoped for and was on a subject I really wanted to know more about. It taught me quite a bit about how DART works and directly affected the design of a project I have been working on.

ROBERT BASLER
via the Internet

GOOD OLD MOM AND POP

I have noticed that there have been many bold predictions about how the number of ISPs will decrease as more large corporations come online and offer services. I don't see how an ISP—either local or nationwide—will go out of business if it is providing quality access and good customer service at a fair price. The one thing that the national ISPs cannot provide as well as a mom-and-pop ISP is personalized customer support.

LANCE ALLIGOOD
via the Internet

LEAVING LAS VEGAS

I think Dvorak's predictions as to the demise of Las Vegas (Inside Track, January 21, 1997) are greatly exaggerated. People have been saying the same thing ever since Bugsy Siegel came to town. I also think that his assessment of the value of Comdex to Las Vegas is also greatly exaggerated. The natives of Las Vegas claim that the average Comdex attendee comes to town with one shirt and one \$20 bill and never changes either.

JACK O. NASH
via the Internet

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— PC WORLD, December, 1996 —

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Trends

Mobile Momentum

Will a notebook be your business PC of choice?

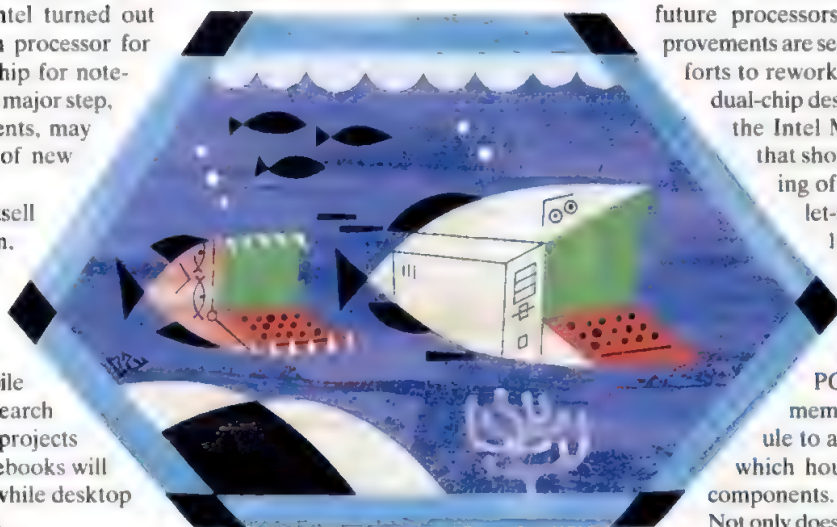
Desktop computers have always had the technology lead over notebooks, but the gap is starting to close. In the past, the latest processors were available in desktops first and in notebooks six months later. This time around, Intel turned out a 200-MHz MMX Pentium processor for desktops and a 166-MHz chip for notebooks on the same day. This major step, as well as other developments, may hasten the market arrival of new portable technologies.

Desktops continue to outsell notebooks by a large margin, but notebooks are in the midst of a growth spurt. "The momentum is mobile," says Mike McGuire, senior industry analyst for mobile computers at the market research firm Dataquest. Dataquest projects that worldwide sales of notebooks will grow 21 percent next year, while desktop sales will increase 18 percent.

A significant force behind this shift is Intel's escalating influence over the notebook market. In mid-February, the world's leading microprocessor manufacturer introduced three devices intended to expedite and enhance the design of mainstream notebooks. The new Intel Mobile Module integrates an MMX Pentium processor, a secondary cache, and the just-announced 430TX PCIset onto a card that plugs into a mobile motherboard. Such a device means that notebook manufacturers no longer have to worry about processor-specific circuitry, thermals, and electromagnetic interference.

As further evidence of Intel's increasing in-

terest in the notebook arena, the company recently bought 12.5 percent—valued at \$52 million—of Xircom, a maker of PC Cards for connecting notebooks to corporate networks and the Internet. As part of both companies'



strategies to build advanced connectivity for notebooks, 1-gigabit Ethernet cards are planned. Xircom expects the cards to be available within the next 18 to 24 months for the same price as 100Mb cards.

"The adoption rate on notebooks used to lag one processor generation behind desktops," says Xircom CEO Dirk Gates. "The functionality gap has closed, but the price gap still remains. Over the next few years, we'll see the price gap decreasing." He adds that a "psychological breakpoint" will be hit when you can buy your dream PC or your dream notebook for less than \$3,000.

The Intel 430TX PCIset, now under produc-

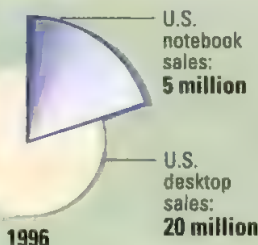
tion, is designed for portables as well as desktops. It's the first mobile chip set to support Concurrent PCI (which lessens processor latencies for greater multimedia performance), Ultra DMA (which speeds data retrieval), Universal Serial Bus (a high-speed interface for peripheral devices), and the fledgling memory technology known as synchronous DRAM.

Intel expects mobile TX machines to deliver greater power management, desktop-like performance, and a natural upgrade path to future processors. Yet performance improvements are secondary in Intel's latest efforts to rework the mobile market. The dual-chip design of the TX is central to the Intel Mobile Module, a device that should alter the manufacturing of notebook PCs. The wallet-size card includes a 150- or 166-MHz MMX Pentium, a secondary cache, a system clock, and the "North Bridge" of the 430TX chip set. A 3.3V PCI bus and a 3.3V, 64-bit memory bus connect this module to a notebook motherboard, which houses the "South Bridge" components.

Not only does this module simplify notebook designs, but it also lets manufacturers use a common motherboard for several processors. For instance, a manufacturer can design a motherboard to hold the new MMX Pentium module this summer, then reuse the motherboard design when modules for Deschutes—Intel's first P6 mobile chip—ship next year.

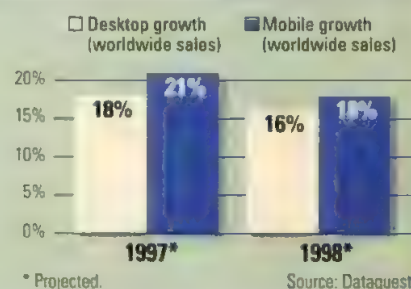
While Intel's new hardware is closing the gap between desktop and mobile performance and enhancing mobile designs as a whole, notebooks' price premium is still holding back corporate buyers. Says Dataquest's McGuire, "Desktops will rule for the rest of the decade."—Cade Metz and Carol Levin

- NEC (236,000 units)
- Texas Instruments (370,000 units)
- Compaq (481,000 units)
- IBM (595,000 units)
- Toshiba (1,100,000 units)
- Other (2,218,000 units)



Desktops Dominate, But Portables Are Poised for Growth

Although U.S. sales of 5 million mobile computers in 1996 pale in comparison with desktop sales of 20 million, market research firm Dataquest predicts that the future growth in mobile sales will outpace growth in desktop sales.



More Research, Please

Federal funding for high-tech R & D.

American businesses spend billions of dollars every year to produce high-tech appliances and gizmos that consumers will buy en masse. In an effort to encourage the same vigorous financial investment in basic research, Uncle Sam helps finance both public and private research and development, with the intended goal of furthering science and technology for the common good.

The White House has earmarked \$75.5 billion for research and development in its \$1.7-trillion-dollar budget proposal for 1998. Under the plan, funding for computing and communications will increase 9 percent over the previous year to \$1.6 billion. Spending on defense research and university research will increase only 1 percent and 2 percent to \$40.5 billion and 13.3 billion, respectively.

Several high-profile public programs—including the Next Generation Internet Project, a faster, fiber-optic version of the Internet that will connect universities and scientific institutions—are slated to receive about

\$100 million. The budget also sets aside \$425 million for the Technology Literacy Challenge Fund, which aims to expand technology in schools. The Technology Innovation Challenge Grant, which provides matching federal funds to develop innovative applications for schools, is slated to get \$75 million. And the National Information Infrastructure Grants Program is funded for projects that improve the delivery of federal educational, health, and social services.

The budget proposal also includes a one-year extension of the R&D Tax Credit. Part of the tax code since 1981, the credit allows a company that spends a certain percentage of its revenues on high-level technical jobs to write off money spent on wages. The R&D Tax Credit Coalition, which represents thousands of businesses, had urged President Clinton to fund a permanent extension of the credit. Bill Sample, senior director of domestic taxes and tax affairs at Microsoft, says on behalf of the coalition, "The effect of this incentive is particularly helpful to smaller companies in funding the significant expenses associated with the development of new and enhanced products." —Angela Hickman



INSIDE PC LABS

Utility Quicksand

AFTER LAST YEAR'S COVER STORY ON utilities (May 14, 1996), we received a letter from a reader complaining that Norton AntiVirus, Norton Navigator, and Norton Utilities provided improved security, data integrity, and system navigation but also brought his PC to a crawl. Such complaints are neither uncommon nor limited to Symantec utilities.

In this issue, we make our first attempt to quantify the performance hit PCs experience while running antivirus software. To do so, we ran our Business Winstone 97 benchmark tests—a collection of eight popular applications—on two systems, one with the utilities loaded and one without. The results give us a rough idea of how much some utilities can degrade performance.

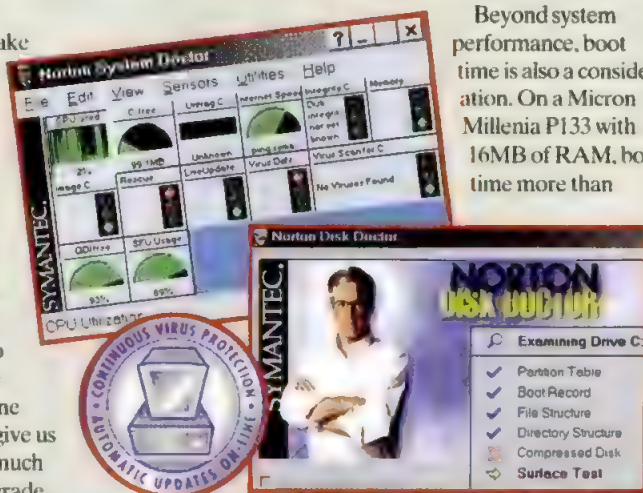
System degradation ranged from none (IBM AntiVirus) to 8 percent (Norton AntiVirus and TouchStone Software's PC-cillin). Norton AntiVirus and PC-cillin also received the best virus-detection scores. The conclusion: You need to weigh your own needs and decide between aggressive virus detection and overall system performance. One rule of thumb: You won't notice performance changes that are within 10 percent of the norm. An 8 percent hit may not be much cause for concern and an 8 percent gain not much cause for celebration. The catch is that most users run more than one utility. And when combined, a slew of utilities may cross the 10 percent threshold and result in a noticeable performance hit.

CONFIRMING THE THEORY

To confirm this theory, we tested various combinations of utilities. Like Norton AntiVirus, Norton Utilities caused a performance hit of about 10 percent. Furthermore, the combination of Norton AntiVirus and

Norton Utilities reduced the Winstone score by 20 percent. But Symantec is not the sole offender. Uninstallers cause degradation, too, including Microhelp Uninstaller 4 (4 percent) and Quarterdeck CleanSweep (9 percent). And Microsoft Plus! for Windows 95 caused a 7 percent performance hit when we loaded a high-resolution desktop theme.

Beyond system performance, boot time is also a consideration. On a Micron Millennia P133 with 16MB of RAM, boot time more than



PERFORMANCE HITS: In PC Labs testing, systems that ran a combination of utilities showed a noticeable degradation in performance.

doubled, from 27 seconds on a clean installation of Windows 95 to more than a minute with Microsoft Plus!, Microsoft Office 97, Norton Utilities, Corel WordPerfect Suite, and Novell's NetWare client. The biggest offenders were Norton Utilities and the NetWare login script process, which added 10 and 15 additional seconds, respectively.

You may question our awarding Editors' Choices to Norton Utilities and AntiVirus. We feel that the programs' value makes up for any loss in system performance, but we do strongly urge Symantec and other software vendors to look into this problem. In Bill Gates's *The Road Ahead*, he notes that OS/2's problems stemmed from the fact that IBM was out of touch with PC users. "For instance, it took 3 minutes for one version of OS/2 to boot," he writes. "That didn't seem bad to them, because in the mainframe world, booting could take 15 minutes." My computer takes 2 minutes 58 seconds to boot. Two seconds to go. —Ben Gottesman

Fast, Free Video

RealVideo puts the Web in motion.

Progressive Networks, creator of RealAudio, made a splash recently at the exclusive Demo 97 conference when it introduced its RealVideo software, designed for video streaming over the Web, and announced that a prerelease version of the product is available for free download from its Web site (www.real.com). Aimed at owners of 28.8-Kbps modems, RealVideo joins Microsoft's NetShow and VDONet's VDOLive in the major push to make streaming video on the Web as popular as streaming audio.

In conjunction with the RealVideo debut, Progressive Networks announced that ABC, C-SPAN, Time-Warner, and others plan to use RealVideo to send news clips, music videos, and live sports events across the Internet. CBS News, MTV, and PBS are currently using competitor

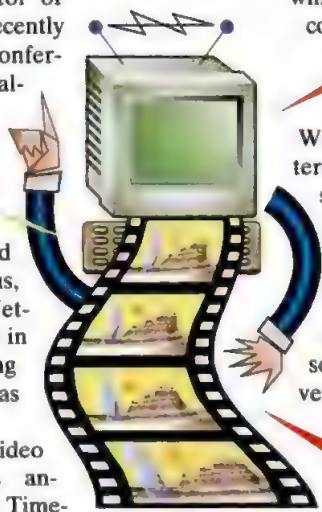
VDOLive, which, according to VDONet chairman Asaf Mohr, has more than 5 million users. Meanwhile, Microsoft is targeting its NetShow streaming-video software—which uses a VDONet codec—primarily at corporate intranets.

Because streaming video on the Web is used mostly for entertainment applications such as "multicasting" concerts and sports events, most people don't associate the technology with business applications. Microsoft, however, is an investor in VDONet, and both companies are zoning in on the corporate intranet market. Among the intranet scenarios that Microsoft cites for NetShow are online training videos, event and briefing videos, and guided tours of products and workplaces. According to VDONet's Mohr,

future products will likely combine VDONet and Microsoft technologies.

VDONet—which is Progressive Networks' chief competitor—has consistently staked out the high end of the market. For example, U.S. Robotics is working with VDONet to create video-streaming sites based on U.S. Robotics' proprietary 56-Kbps modem technology. Mohr says his company is focusing on high-bandwidth connections. "Progressive Networks is doing video streaming for low bit rates and specifically dial-up rates," he says. "Our streaming-video solution is bandwidth-independent. As a consequence, the video content is not low-quality and prone to eventual obsolescence."

RealVideo has attracted attention for using buffering technology to work smoothly with lower-bandwidth, 28.8-Kbps connections, but VDONet's competitive emphasis will remain on high-bandwidth solutions. As Mohr says, "A focus on low-bit rates means producers have to produce content three times for users with various pipes instead of once for a bandwidth-independent solution."—*Sebastian Rupley*



JAKE KIRCHNER

Of Chickens, Eggs, and Smart Cards

We see a lot of products at *PC Magazine*—a lot of products. Some of them we quickly dub “very cool,” and some we pronounce “losers.” And every now and then we come across a new product, like Personal ATM from VeriFone, to which we really don't know how to react.

The idea behind Personal ATM—from the same company that provides many of the electronic-payment systems you see in stores, banks, health-care offices, and the like—is to put in peoples' homes small “cash” machines that they can use to download digital cash from their bank accounts onto “smart,” or “stored value,” cards—credit card-like cards with embedded chips. Each device, about the size of a portable CD player, has a phone dialer pad and one-line display and features either a modem for direct dial-up connections to banks or a serial port for connection to a PC for Internet-based access. Banks—in theory—could install them in customers' homes as natural adjuncts to their growing electronic banking systems.

Here's how it all works: You simply slip your card into the device, make the connection, and key in the amount you want to download. Then you use your card for making purchases wherever there are payment terminals that accept it and subtract the amount of the purchase.

Smart cards have been in use for more than 20 years, providing access to government benefits and health-care services. Europe is awash in smart cards; people use them at pay phones, when buying theater tickets, and when paying cab fares. By one industry esti-



mate, there are almost a billion smart cards in use today worldwide, and that number should hit 4 billion by the year 2000.

The U.S. has been slower to adopt smart cards, although a pilot program was implemented at the Atlanta Olympics, and there's another program in New York City put together by Chase, Citibank, MasterCard, and Visa involving as many as 500 merchants and 50,000 cardholders.

This brings up what you no doubt have already recognized as the barrier this system has to overcome: the almost total lack of payment terminals in the U.S. It's one humorous chicken-and-egg problem. Who's going to want to carry a cash card if there are no places to use one?

In theory, there's no end to uses for stored value cards, especially for so-called micropurchases at supermarkets, pay phones, movies, vending machines, fast-food stores, and gas stations. According to Thomas Kilcoyne, vice president and general manager of VeriFone's Consumer Systems Division, Americans spend \$2.2 trillion a year on cash purchases under \$20.

When I asked him how soon he expects to see Americans walking around with these cards in their pockets, Kilcoyne could only shrug and say, “I don't know, but it *will* happen.” I countered that I didn't see why this was any more convenient than cash. “Let me put it this way,” he said. “Would you be willing to carry one of these cards if it allowed you to get frequent-flier miles for every dollar you spend on these daily purchases?” At that point a light went on. “Hmm,” I said, “very cool.”

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CIRCLE 005 ON READER SERVICE CARD



NOTEBOOK PCs

MMX: The Second Wave

Since the introduction of MMX notebooks in January, three more major vendors have announced new portables that feature Intel's MMX Technology. Two of these machines—from IBM PC Co. (800-426-2968, www.pc.ibm.com) and AMSTech (800-886-2671, www.amstech.com)—also boast spacious 13.3-inch active-matrix XGA displays, the largest displays available for mobile systems. (For a review of the NEC Versa 6200MX, which also has a 13.3-inch display, see First Looks in this issue.)

The high-end **IBM ThinkPad 765D** (priced at about \$6,500) includes a 166-MHz Pentium processor with MMX Technology, 32MB of RAM, a 3GB hard disk, 256K of L2 cache, an 8X CD-ROM, and 2MB of VRAM graphics memory. The 765D—a follow-up to the ThinkPad 760XD—weighs roughly 7.5 pounds and runs for an estimated two hours on an internal lithium ion battery. The system features front and rear Fast IR ports, the digital signal processor, mWave, and a 28.8-Kbps onboard modem, as well as stereo speakers, a built-in microphone, and headphones. When IBM begins shipping the 765D in June, the company will include OSR2 Windows 95 (see the Trends Software page in this issue) and MPEG2 hardware support.

A lesser known player, AMSTech, is offering the **TravelPro 2010**—another 166-MHz MMX portable with an XGA 13.3-inch display. The \$5,700 (street) TravelPro 2010 has 32MB of EDO RAM, a removable 2.1GB hard disk,

512K of secondary cache, 2MB of VRAM graphics memory, a lithium ion battery, and an internal 10X CD-ROM drive. The unit also offers an integrated 33.6-Kbps modem, a Fast IR port, 16-bit wavetable sound, and built-in video capture. The Type III PC Card slot supports Zoomed Video.

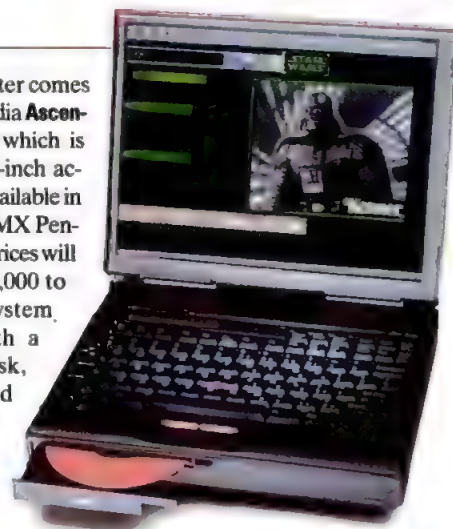
AMS has also announced two 166-MHz MMX notebooks in the **TravelPro 188** series. The 12.1-inch active-matrix version sells for \$3,650 (street) and features 16MB of EDO memory, a 2GB hard disk, 256K of L2 cache, a 6X CD-ROM, a Fast IR port, 16-bit sound, a 128-bit Neo-Magic graphics, and 32-bit CardBus support.

RECAP Our roundup of six MMX notebooks appeared in First Looks in the issue of February 18, 1997; the Micron TransPort XPE was awarded Editors' Choice. Five additional MMX notebooks were highlighted in Trends PCs in the same issue.

From AST Computer comes the premium multimedia **Ascentia P** series, each of which is equipped with a 12.1-inch active-matrix display. Available in 150- and 166-MHz MMX Pentium configurations (prices will likely range from \$3,000 to \$5,000), each system comes standard with a 2GB or 3GB hard disk, a 10X CD-ROM, and 256K of L2 cache. Standard system and graphics memory sizes had not been determined at press time.

Machines in the **Ascentia M** series—

AST's slim form-factor line—will sell for from \$3,000 to \$4,000, depending upon processor and configuration. This series will include 133- and 150-MHz MMX models that offer 16X CD-ROM drives and 2GB hard disks. As with the Ascentia P series, several different memory configurations will be available, but AST has not yet decided on a standard.



THE FORCE IS WITH YOU: The IBM ThinkPad 765D has a 13-inch screen.

Each M series machine will also ship with a 33.6-Kbps modem; the P series modems are 28.8 Kbps. Machines in the M series will all have Zoomed Video support, 32-bit CardBus support, and a Fast IR port. AST offers buyers a choice of having Microsoft Windows 95 or Windows NT 4.0 preinstalled.—Cade Metz

NOTEBOOK PCs

Rushing the Gate: A 200-MHz Notebook

Even though the 200-MHz Pentium chip for mobile systems is not yet available, the 200-MHz notebook computer has arrived, bringing with it a few caveats. With the \$3,999 **Orion 8X-200**, Nimantics (800-646-5005, www.nimantics.com) has introduced Intel's standard 200-MHz Pentium chip—which was originally meant for desktop machines—into the mobile space.

The Orion 8X-200 has two fundamental flaws.

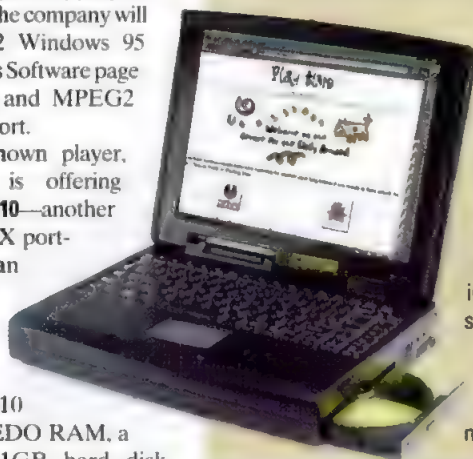
First, the unit gives off an inordinate amount of heat for a laptop. And the 8X-200's performance may not stand up to today's 150- and 166-MHz MMX portables because of the system's comparatively low internal cache and slower chip set.

While Intel's mobile chips have a low-voltage inner core and never exceed 8 watts, the

desktop Pentium/200 runs internally at 3.3 volts and generates about twice as much heat. So when you boot the 8X-200, a rather clamorous processor fan starts up and keeps running until the machine is powered off. The chip is also a significant drain on the 8X-200's internal nickel hydride battery, though Nimantics provides a second battery that can be easily swapped with the system's floppy disk drive.

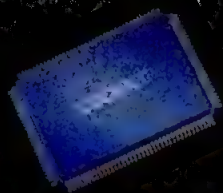
This 7.5-pound notebook also has an integrated 8X CD-ROM drive, a 1.3GB hard disk, 32MB of EDO RAM (expandable to 72MB), and 256K of pipeline-burst cache. Despite such components, the 8X-200 cannot compete with extant MMX notebooks. Its primary cache measures only 16K, compared with 32K for a Pentium MMX notebook. And the unit can't benefit from Intel's industry-leading mobile Triton chip set. It does, however, have a 12.1-inch SVGA active-matrix display, wavetable sound with 16-bit FM synthesizer stereo, 64-bit PCI graphics with 2MB of VRAM, and hardware MPEG.

Nimantics provides high-end I/O (an IrDA infrared port, a NTSC/PAL video-out jack, Zoomed Video support, and a MIDI game port) as well as a PC Card bay that accommodates three Type II slots, or one Type II slot and one Type III slot.—CM



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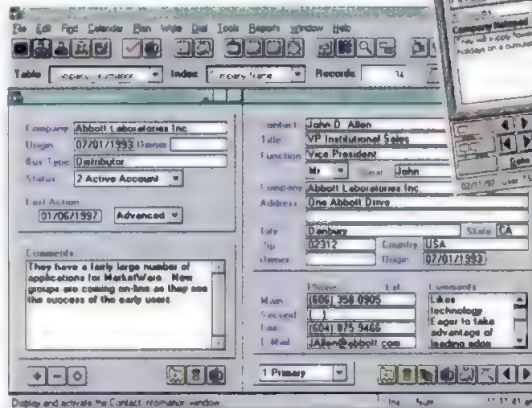
SALES AUTOMATION

Enterprise-Wide Sales Aids

There are a variety of sales tools targeted at small businesses, but if you work for a large company that's looking for a better way to manage its corporate sales force, pool its customer resources, and coordinate its marketing strategies, these three enterprise-class software bundles are sure to be of interest. Although they represent only a small part of the highly competitive sales-automation field, each offers a series of customizable, multi-purpose databases that can be accessed from many platforms across a network.

TeleMagic's **TeleMagic Enterprise for Windows, Version 3.0** (800-835-6244, www.telemagic.com), scripted entirely in Microsoft FoxPro, supports wireless messaging, e-mail, word processing, fax processing, data synchronization, and report writing. It can be specially configured for telemarketing or hotel management. By using

DacEasy Accounting, TeleMag-ic can be customized for accounting and financial resources, and by using Timeslips, for legal case management and billing needs. Both DacEasy and Timeslips are corporate siblings of TeleMagic.



Compatible with both current and older versions of NetWare and Windows NT Server, TeleMagic's databases are structured in a three-level relational hierarchy that stores company information in level one, sales and

marketing opportunities and contact information in level two, and project, proposal, and sales status in level three. The system is capable of supporting from two to several thousand

be merged into any document.

Pricing varies depending on the size of your business; customization costs range from \$10,000 to \$50,000, and the cost per seat ranges from \$500 to \$1,000.

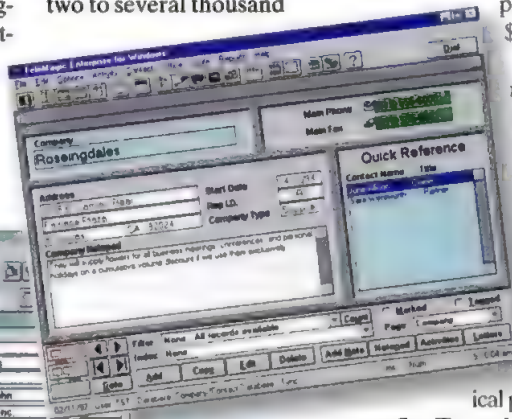
Trilogy Development Group's **Selling Chain** (512-794-5900, www.trilogy.com) is a bit different. The package is designed to help salespeople actively pitch products to customers by generating product specifications, price quotes, and graphical product demos on the

fly. To make this work, Selling Chain links such behind-the-scenes activities as pricing approval and product searches to the salesperson's console via a series of multi-layered modules written in C++.

Selling Chain runs on an OLE backbone, which facilitates seamless integration of outside applications, such as word processors and ODBC-compliant databases. It supports Windows NT Server and NetWare, and it is accessible via Windows 95 on the client side. In addition, SC Web, a Java-based version that is compatible with the Internet and corporate intranets is now available.

The program's modules include: SC Quote, which generates professional sales quotes for customers; SC Pricer, which provides salespeople with up-to-date pricing, including taxes and discounts; and SC Proposal, which culls information that's specific to the products being purchased and delivers it to in-house personnel and customers. SC Order manages the information flow between the point of sale and the back-end order-management systems, while SC Catalog is an electronic marketing encyclopedia for product searching and interactive browsing.

Pricing ranges from \$5,000 to \$10,000 per user, depending on the modules selected.—Josh Levy



SALES CHAIN: MarketWare (left) and TeleMagic (above).

users or more.

For a ten-user network, TeleMagic costs \$2,300; prices generally range from \$150 to \$200 per client for large, multiuser installations.

MarketWare Software's **MarketWare, Version 5.0** (801-944-4230, www.mktware.com) bills itself as an industrial-strength product designed to address the needs of sales, marketing, and customer service organizations. Targeted at groups of from 10 to 500 users, it is like TeleMagic—a customized Microsoft FoxPro relational database system.

MarketWare structures data into Action Plans, which can be managed and tracked from initial lead generation through final sale, billing, and payment. The program links up with such client/server databases as Oracle, SQL server, and Sybase, or with any ODBC-compatible system. It runs on Novell- or Windows NT-based servers, and clients can access it via Windows 95, or Windows NT 3.51 or later. MarketWare also integrates seamlessly with Lotus WordPro (Version 7.0 or earlier), Microsoft Word, and Corel WordPerfect 7.0, and information from a MarketWare database can

OPERATING SYSTEMS

Windows 95, Take Two

By now, you've probably been hearing a new acronym being bandied about: OSR2. And no, it doesn't refer to a distant cousin of R2-D2, the character from *Star Wars*.

OSR2 is shorthand for the new interim Service Release 2 of Microsoft Corp.'s Microsoft Windows 95, which is available solely for OEMs (www.microsoft.com). The Service Release provides new drivers and functionality that the original release lacked, and it incorporates various updates to Windows 95 that were previously available only as separate patches. Consider OSR2 a precursor of what's to come, as the new features will be included in the Windows 97 release due at the end of this year.

The most important news is the enhancement of the Windows 95 FAT file system to include support for FAT32 partitions, which lets you use large hard disks optimally. Other key enhancements that OSR2 brings include support for PC Card 32 bridges, IRQ routing, libraries for the Open-GI graphics standard, ActiveMovie video playback, Intel's Pentium with MMX, IrDA 2.0, voice modems, automatic launching of Scan-disk upon rebooting an improperly shut-down PC, client-side NetWare 4.x, and improved Dial-Up Networking.—Melissa J. Perenson

Trends Peripherals

UNIVERSAL SERIAL BUS

Getting Aboard the USB

Plug-and-play is about to take on a whole new meaning, thanks to the arrival of devices supporting the Universal Serial Bus (USB).

USB is the new interface standard that lets your system automatically detect and configure a variety of low- and medium-bandwidth peripherals—including input devices, page scanners, and monitors—that can connect to a USB port or hub. When using a hub, you can hot-swap among multiple peripherals, such as a mouse, scanner, and joystick, without having to fumble around with the connections on the back of your PC. If you connect a USB hub to your system or buy a peripheral that itself has a USB hub, you also gain several additional

USB ports so you can attach nontraditional peripherals.

Before you start shopping for USB peripherals, though, there are some hardware obstacles to overcome. First, you need a USB-compliant PC running OSR2, the OEM upgrade to Microsoft Windows 95, which is available only on new systems. Most new PC systems are USB-compliant and run OSR2; ask your system vendor if you have questions. And although many manufacturers are starting to offer USB peripherals—keyboards and monitors in particular—many others don't intend to release them until Microsoft releases Windows 97, which is expected to contain a more robust USB driver. And

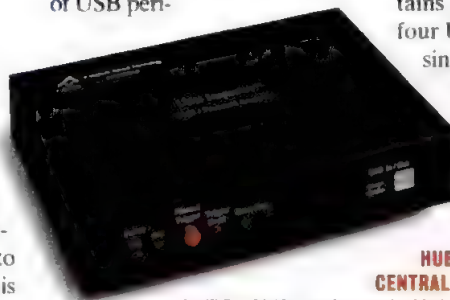
USB expansion card upgrades won't appear until year end.

Despite the slow movement of USB peri-

like speakers, CATC's **USB Andromeda Hub** (\$75 street) is small (4 by 2.5 by 0.9 inches) and contains ports that let you connect four USB-enabled devices via a single USB port.

Northstar Systems' **USB HubStar Model 100** (\$100 street) is a bit bigger (4.5 by 3.0 by 1.7 inches), but it contains five ports. Both hubs should be released by May.

You can also purchase a peripheral that is itself a hub, complete with USB ports. Hyundai Electronics America (800-568-0600, www.hea.com) is readying USB-compliant monitors with a hub option for release this spring. The 17-inch **DeluxScan 17B+** (\$609 list) and the 15-inch **15G+** (\$379 list) each have three USB ports at the base so you can connect three USB-enabled peripherals.—Toni Kistner



HUB CENTRAL: CATC's USB Andromeda Hub.

pherals to market, early adopters too eager to wait for Windows 97 do have options. Both Computer Access Technology Corp. (CATC) (800-909-2282, www.catc.com) and Northstar Systems (800-483-9900, www.northstar1.com) are putting the finishing touches on USB hubs that attach to a system's USB port and sit on the desktop

MONITORS

Desktop LCD on a Budget

Every major CRT monitor maker has announced plans to sell a flat-panel LCD monitor, and many others already have products on the market. Trouble is, at around \$3,000 for a 14.5-inch (diagonal) panel—six times the price of a comparable 15-inch CRT monitor—these space-saving displays are relegated to niche markets.

Enter the Portrait PageMaster LCD from Portrait Display Labs (800-858-7744, www.portrait.com). This desktop monitor, which measures 15 inches diagonally, is priced at a more appealing \$1,500 (street). The company uses a passive-matrix LCD panel rather than the active-matrix type found on higher-priced units; the tradeoff comes in the form of trails and ghosting in video applications and a narrower viewing angle. For static applications such as word processing, desktop publishing, and Web surfing, though, the unit delivers a crisp, bright image edge-to-edge. Even better, the PageMaster's unique pivoting design lets you view the screen in the standard landscape mode or rotate it for a portrait view of any Windows application. This lets you see the full length of an 8.5- by 11-inch page, and you can see more of your Web pages in a single clip.—Jamie M. Bsates



21-INCH MONITORS

The Bigger Picture

Even though LCD monitors such as Portrait Display Labs' PageMaster LCD offer an intriguing glimpse into future office environments, conventional CRT monitors are still firmly entrenched on the desktop and remain the only cost-effective solution for those who need an extra-large screen.

Monitor giant NEC Technologies (800-632-4636, www.nec.com) has introduced the **MultiSync E1100** (\$1,700 street), a 21-inch model boasting a 0.28-mm dot pitch and a maximum resolution of 1,280 by 1,024 at 76-Hz refresh. The E1100 makes use of NEC's FullScan capability to deliver an edge-to-edge display with no black borders.

At the ultra-high end, ViewSonic Corp. (800-888-8583; www.viewsonic.com) is raising the

bar with its **MegaMonitor** (\$2,000 street). Boasting the highest resolution in its class—1,800 by 1,440 at 76 Hz (or 1,600 by 1,200 at 91 Hz)—this model is targeted at such precision-oriented applications as CAD and desktop publishing. This unit features an Invar shadow mask design with a 0.25-mm dot pitch.

ViewSonic's 21-inch **G810** (\$1,500 street) is another option.

It has a maximum resolution of 1,800 by 1,400 at 75 Hz, and the same ultrafine 0.25-mm dot pitch.

KDS USA (714-379-5599, www.kdsusa.com) is debuting the 21-inch **VSx-21** as part of its Visual Sensations line.

The VSx-21 (\$1,600 street) uses a 0.28-mm Invar shadow mask and delivers an impressive resolution of 1,600 by 1,024 at 85 Hz.—TK



PICTURE WINDOW: The NEC MultiSync E1100.

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NEC

WEBCASTING

Pushing Content Along

The race to take over your desktop with content continues at a breakneck pace. Since our last look at this rapidly emerging field, it has expanded. Six new entries designed for both the consumer and intranet markets are taking advantage of new push technology.

IFusion Com's **ArrIve** (888-227-7483, www.ifusion.com) is a free client that uses a

TV metaphor to deliver a variety of content channels to your computer. The on-screen remote control allows you to switch between channels and to customize the information you'd like to receive. The content is then displayed either through the Channel Player or as a screen saver. The Channel Guide serves as a road map to the programs available on each channel. Content providers, which currently include CNNfn, Epic Records, USA Today, and the Weather Channel, use ArrIve's Channel Server to transmit information. ArrIve requires Microsoft Windows 95, or Windows NT 3.51 or later, and either Microsoft Internet Explorer 3.0 or Netscape Navigator 3.0. IFusion has also developed an ArrIve product for use with intranets.

Lanacom's **HeadLiner** (416-490-7744, www.lanacom.com), which is available as a free download, uses

Content Agents to cull information from an impressive array of domestic and international Internet news sources, such as Bloomberg, CNN, and ESPNet. HeadLiner then delivers that information directly to your computer in the form of either a

news ticker or a screen saver. Simply double-click on an item to launch your browser and go to the full text. By allowing you to construct a highly detailed user profile, HeadLiner goes a long way toward delivering only the information you want. HeadLiner requires Windows 95 and any Web browser.



THE LATEST PUSH: ArrIve (above) and HeadLiner (top right).

inCommon's **Downtown** (415-345-5432, www.incommon.com) is a free client that brings summaries of Web sites to your desktop in the form of channels. The program uses a toolbar to deliver over 70 basic channels, covering topics from news to business information, and there are premier channels offering content from *The New York Times* and CBS News.

Digital Bindery Corp.'s **Digital Bindery** (212-685-3727, [www](http://www.bindery.com)

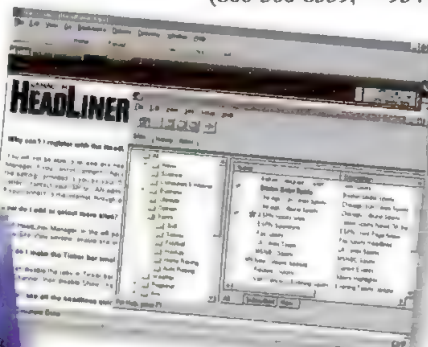
[.bindery.com](http://www.bindery.com)) is a free notification service that monitors Web pages of your choice and sends you a snapshot of the pages

via e-mail whenever updates occur. After an initial sign-up procedure, the Digital Bindery subscriber toolbar appears inside your browser window. Simply enter the URL for the page you want to subscribe to and click Add to include the

page on your subscription list.

Digital Bindery works with any platform and any MIME-compliant e-mail program, although it does require that you use either Internet Explorer 3.0, or Netscape Navigator 2.0 or later.

Wayfarer Communications' (800-300-8559,



www.wayfarer.com)

Incisa is a Webcasting product designed specifically for corporate intranets (prices start at \$5,000 for 100 seats). News items are delivered in the form of headlinks, which are headlines that are hotlinked to the full text of the item. The sender can choose to broadcast the information to everyone or limit it to a specific group within the company. Information is transmitted using the Wayfarer

QuickServer and can be drawn from both corporate databases and Internet sources. Incisa requires a Windows 3.1, Windows 95, or Windows NT client, and a Sun Solaris or Windows NT server.

Diffusion's **IntraExpress** (415-934-2550, www.diffusion.com)

is another product designed specifically for corporate use. The product, which is available as a \$35,000 starter kit (100 recipients and 5 senders, plus support and setup) allows the sender to distribute the information to the whole company or only to a specified group. IntraExpress supports information delivery over a variety of media, including e-mail, Web site postings, paging, network printers, and fax.

The receiver can also choose not to accept delivery or to be notified when new information is available. To receive messages, IntraExpress requires a Windows NT server and Windows 3.1, Windows 95, or Windows NT, as well as a Java-enabled browser.—Nancy Sirapyan

WEB DEVELOPMENT TOOLS

Preferential Treatment

Marketers and corporate creative teams looking to make their Web sites more interactive and dynamic should consider MicroMass Communications' **IntelliWeb** (888-333-1232, www.micromass.com). This \$15,000 software package takes the personal information of visiting users and custom-configures your site on the fly to reflect users' individual preferences.

Visitors to an IntelliWeb-powered site are prompted to complete a personal profile, which is then regularly accessed and referenced to touch up either a single HTML page or an entire multidocument site so that the site is tailored to the user's preferences. If a user has visited an IntelliWeb site before, the program can be set either to prompt the user for a PIN first or to detect the user's profile automatically. Each user's profile is stored in a separate database on the server. The server recalls them only when needed, thus limiting the amount of space required for data storage.

To set up a site for IntelliWeb, developers create an HTML template page and tag the portions that will serve as dynamic links to the database. The pages are then run through a parser, which actually creates the database from the dynamic elements.

An optional downloadable IntelliWeb plug-in gives users complete control over their profiles from within their Web browsers.—Josh Levy

RECAP PC Magazine reviewed 11 Webcasting clients in the February 18, 1997, issue. The PointCast Network and AirMedia Live were awarded Editors' Choices.



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ISDN ADAPTERS

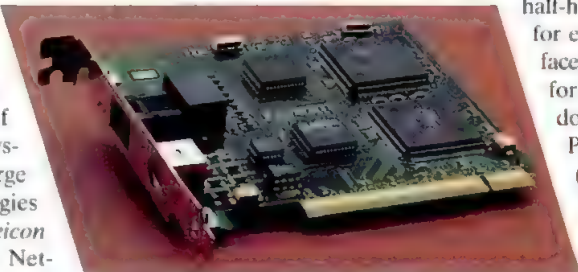
The Next Great Migration

In the next six to nine months you'll be seeing many ISDN vendors offering PCI versions of their internal ISDN adapters. Fueling this transition to the PCI bus is PCI's bus mastering (which reduces the load placed on the system's processor), plug-and-play functionality, a wider 32-bit data path, and the greater availability of PCI slots in newer systems. Leading the charge are Eicon Technologies (800-803-4266, www.eicon.com) and Tiger Jet Network (408-725-7506, www.tigerjet.com).

Eicon, a long time player in the ISDN arena, has ported over its Diva line of adapters to the PCI format. The **Diva 2.0** (\$349 with an S/T interface; \$399 with a U interface) comes with Microsoft Windows 95, and Windows NT 3.51 and 4.0. The Diva also supports EZ-ISDN1, a set of stan-

dardized provisions that eases ordering an ISDN line. Trace diagnostic tools included are for checking the circuit's condition.

The higher-end **Diva Pro 2.0** (\$499 for an S/T interface; \$549 for a U interface) includes all the



MASTERING IT ALL: The Diva Pro with its DSP design takes some of the workload off your system's processor.

basic features of its lower-end cousin plus the ability to emulate analog connections over an ISDN line without using a POTS port. It also supports group 3 (analog) and group 4 (digital) fax machines over ISDN and an RJ-11 connec-

tion. The Diva Pro's digital signal processor (DSP) takes some of the processing workload from the CPU and transfers it to the card itself. Eicon is working on an optional dual POTS port module for the Diva and Diva Pro. It should be released by the time you read this.

For the cost-conscious, Tiger Jet Networks recently released its **Tiger Jet PCI ISDN** modem. This half-height card, priced at \$99 for either a S/T or U interface, also comes with drivers for Windows 95 and Windows NT. It also supports Point-to-Point Protocol (PPP) and Multilink Point-to-Point Protocol (MP). One handy feature of the Tiger Jet is that it automatically determines the type of telecommunications switch (ATT&T 5ESS, DMS100, or NI1) that is connected to your ISDN line and makes all the necessary adjustments needed. There is one drawback to the Tiger Jet: It ships without a POTS port.—Robert Daly

MANAGEMENT

IS for Rent

With the continued growth in complexity of networks and the challenge of doing more with less, many IS departments have out-tasked the overall management of the company network, thus freeing their in-house IS departments to focus on day-to-day operations.

Network Defenders (508-490-7400, www.nwdi.com) recently debuted its **ProVision** service with the goal of moving its customers from reactive to proactive management of their networks. ProVision (\$2,600 per month for a 100-node network) has three components. The ProVision Server Collection Engine is a server that's installed on the customer's network by Network Defenders' engineers and uses Advanced Network Support System (ANSS) to gather raw statistical data via network-enabled MIB2, RMON, and SNMP.

The ProVision Processing SubSystem, usually located at a Network Defenders site, works to compile raw data and convert it into standard reports. Network Defenders sends out a CD-ROM containing weekly reports and several databases. The third component—the ProVision Client Interactive Graphical Viewer—is used to customize and publish the various reports to the corporate intranet.

International Network Services (888-467-8100, www.ins.com) takes a slightly different approach. Like Network Defenders, INS installs its server, **EnterprisePRO3.1** (\$2,500 per month for networks with 25 devices), which gathers and compiles data using RMON, RMON2, SNMP, and MIBs of devices on the customer's network; no data ever leaves the network.

Users can access up to 15 months worth of management data stored on the server via the corporate intranet and a Web browser. The generated reports can be tailored to the specific needs of each user.—RD

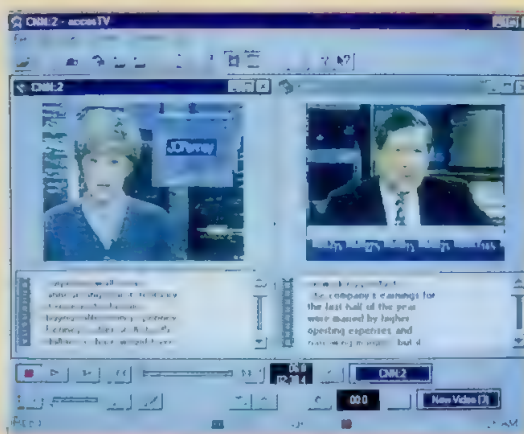
VIDEO

Must See TV—PC Style

The long-standing promise of delivering video to the desktop has been hindered by video's high bandwidth demands. Televitesse Systems (800-611-8848, www.televitesse.com) is changing that, though, with the latest update to its AccesTV product line. AccesTV converts signals from a video stream into easily manageable .AVI file format.

The network component of this three-tiered line is the \$6,995 **AccesTV Server 1.5**, which can broadcast text, audio, and video to any AccesTV clients on the network at rates ranging from 600 Kbps to 5 Mbps, depending on frame size and the number of frames per second. The server also has the same capabilities as the standalone AccesTV Assistant.

The \$699 **AccesTV Assistant 1.5** lets you record, view, and search any analog video signal and store it as an .AVI file. The software can scan video signals and search for user-defined criteria at once. The Assistant searches the closed-caption stream for user-defined keywords when a match is located and then records the feed and saves it as an .AVI file.



The \$199 **AccesTV Viewer 1.5** plays both live video broadcasts and recorded .AVI files and can either be installed on a network client or used as a standalone video-playback solution. The viewer is equipped with a buffer that can store up to 3 minutes of video, so once a keyword is found by the Viewer, it can rewind to the beginning of the video clip.—RD

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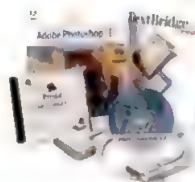
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Product comparison based on independent third party testing using a 200 MHz Pentium computer with Windows 95. Scanners were operated in best quality mode using Adobe Photoshop, TWAIN drivers and SCSI cards included in the box. Images were single-pass scanned at 400 dpi. Executive Mac bundle also available with Adobe Photoshop LE, e Paper™ and SCSI cable. Other scanner configurations available. EPSON is a registered trademark of Seiko Epson Corp. Expression and TrueScan are trademarks of Epson America, Inc. All other trademarks are the property of their respective owners. © 1997 Epson America, Inc.

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First Looks



Digital Darkroom

Getting photo-quality prints from your PC just got easier.—By Daniel Grotta and Sally Wiener Grotta

Given the proliferation of digital cameras, flatbed scanners, and photo CDs, getting images into your computer is the easy part these days. The hard part is producing photographic-quality prints. Although home ink jet printers have come a long way, they're not yet capable of producing continuous-tone, photographic-quality images. With photorealistic dye-sublimation, Thermo-Autochrome, professional ink jet, and some color laser printers costing between \$5,000 and \$50,000, how can amateur digital photog-

raphers and artists get their work out of the computer and into a frame on the wall?

Get a snapshot printer—that's how. Snapshot printers use the same technologies as their professional, large-format counterparts. The only major difference is that snapshot printers produce vivid 24-bit color images that are similar in look and feel to those you get from a one-hour film processor.

Most of these printers are small and light. Some are roughly the size, shape, and weight of a laptop computer, while others

have a footprint small enough to fit conveniently on top of a mini-tower case. With prices ranging from under \$400 to \$500, snapshot printers are economical devices for printing images, although their per-print costs are a little steep: At between \$0.60 and \$1.00 per page, they are about four-times the cost of photographic snapshots.

SMILE AND SAY SNAP

We looked at five snapshot printers that shipped recently: Casio's \$400 Casio DP-8000, Mitsubishi Electronics America's \$480 Mitsubishi CP-D1, Panasonic Interactive Media's \$390 Panasonic TruPhoto, Sony Electronics' \$500 Sony DPP-M55 Digital Color Photo Printer, and Vivitar Corp.'s \$400 Vivitar DigiPhoto. While each of these printers connects to a PC via a parallel port, two offer additional options. The Casio DP-8000 and Sony DPP-M55 can connect directly to Casio and Sony digital cameras, respectively. The Casio DP-8000 requires a special cable; the Sony DPP-M55 uses an innovative infrared link between camera and printer, although using it slows down the transfer process.

To operate properly, most professional continuous-tone printers require hours of setup and installation, as well as some graphic-arts knowledge and skills. But each of these snapshot printers was remarkably fast and easy to set up and use. None has any special system requirements, and each works with a PC running Microsoft Windows 3.1, Windows 95, or Windows NT.

We were able to load and install software, attach printers, and generate first prints—for all five printers—in a total of just over 45 minutes. Except for a quick look to find out which way to load the

INSIDE

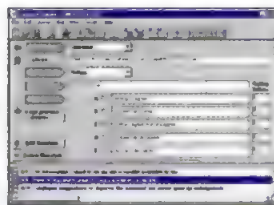


BROWSER BATTLE:

Microsoft Internet Explorer and Netscape Navigator come to Windows 3.1. See page 64.

MOVIN' ON UP:

Intel's Pentium OverDrive Processor with MMX boosts PC power. See page 54 for the story.



SURVEY SAYS: With Decisive Survey 2.0, you can poll over the Internet. For a full review, see page 70.

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First Looks Online

From March 24 to 28, go online to discuss this story.
[**WWW.PCMAG.COM/**](http://WWW.PCMAG.COM/)
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First Looks

paper, we didn't have to refer to the documentation. And unlike ink jet printers, which can take from 15 to 30 minutes to produce the best-quality prints, these snapshot printers produced true photographic-quality prints in from 1 minute 40 seconds to 3 minutes 16 seconds.

Four of the five devices use dye-sublimation, thermal transfer technology, which creates images by applying as many as 255 different levels of heat to three- or four-color ribbons. Vaporized pigments are combined and applied to specially coated paper, which results in not the dithered dots typical of an ink jet printer but in photograph-like continuous tone.

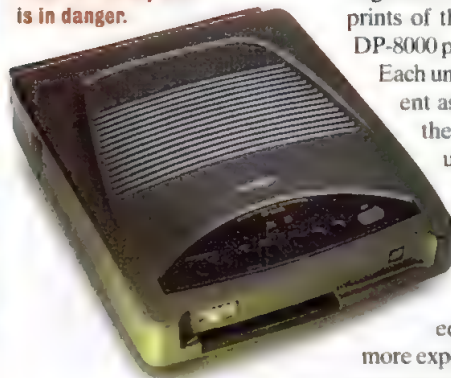
Each dye-sublimation device uses three-color ribbons: cyan, magenta, and yellow. The ViviPrint DigiPhoto adds a fourth ribbon of clear plastic laminate that is placed over the image to protect the final print from fingerprints and bleaching by ultraviolet light.

The only printer of the five that doesn't use a dye sublimation process is the Panasonic TruPhoto, which takes advantage



of Thermo-Autochrome processing. Like dye-sublimation processing, Thermo-Autochrome uses 255 levels of heat to produce continuous-tone colors. But unlike with dye sublimation, Ther-

With prints like those from the Casio DP-8000, film is in danger.



mo-Autochrome color pigments are embedded in the paper itself.

The advantages of Thermo-Autochrome are twofold: At about 60 cents per print, it's cheaper than dye sublimation and because it uses no ribbons, cartridges, or spools, there's nothing to throw away. In addition, Thermo-Autochrome print colors are supposed to last longer than those produced by dye-sublimation printers.

MINE'S BIGGER

Although the output of each of these five units is satisfactory for a snapshot, print sizes vary marked-

ly. At 4 by 6 inches, the Panasonic DigiPhoto produces the largest prints of this bunch; the Casio DP-8000 produces the smallest.

Each unit has a slightly different aspect ratio and crops the original image in a unique way.

Our tests showed that even allowing for size difference the snapshots we produced didn't equal those of their more expensive—and larger—counterparts, though the technologies employed are identical. Most professional continuous-tone printers have a resolution of 300 dots per inch (dpi) or higher. Except for the Casio DP-8000's 297-dpi resolution, the other snapshot printers had resolutions ranging from 144 to 203 dpi. The result are prints with noticeably softer edges than those created with professional printers.

And because they produce images on small sheets of paper, snapshot printers typically work with much smaller—and less detailed—graphics files. In addition, snapshot printers don't come equipped with such professional accouterments as built-in intelligence, sophisticated color management, PostScript, and comprehensive image-enhancing filters.

As a result, we produced a mixed bag of images. Viewed one at a time, these prints look vibrant and sharp. But when you place them side by side with a traditionally processed wet print, there's no question that the photograph is clearer, richer, and more detailed. Of the five, the Casio DP-8000 produced the richest and most detailed prints.

Quality considerations aside, snapshot printers are fun. You can create ID badges for events, instant product shots for proofing, or photos for your wallet. And your kids can make postcards to send to grandma. The advent of true instant photography for the PC means that digital photographers have never had it so good.

PERFORMANCE TESTS

Snapshot Printers

PP LABS For raw performance, the Sony DPP-M55 was in a class by itself. Closest to it were the Mitsubishi CP-D1—about 20 seconds behind—and the Casio DP-8000—about 30 seconds behind. The Panasonic TruPhoto and Vivitar ViviPrint DigiPhoto were the slowest printers.

To run these printers through their paces, we timed how long each unit took to print a 380K JPEG file and a 901K TIFF file using the printer's default values.

■ Small image file (380K) ■ Large image file (901K)
Minutes:seconds

Casio DP-8000	2:13	2:14
Mitsubishi CP-D1	2:04	2:04
Panasonic TruPhoto	2:56	3:16
Sony DPP-M55	1:40	1:45
Vivitar ViviPrint DigiPhoto	2:18	2:25

◀ BETTER



Our original 380K JPEG image shows a variety of colors as well as contrasts between light and dark.

Casio Inc.

Casio DP-8000

With the choice of printing either from your PC or directly from a Casio digital camera, the Casio DP-8000 gets your photos onto paper your way, and it produces the sharpest, clearest, and best color image this side of a traditional photographic print.

With seven buttons, the Casio DP-8000 has a profusion of controls for customizing your prints. In addition, the Casio DP-8000 is the only printer of this group to use a bidirectional parallel port to report printing speed and status—including the color being processed—to the host computer. Users have the option of viewing or hiding a print preview window.

As with the Mitsubishi CP-D1, pressing the Print command invokes the printer's own driver, which adds a few seconds to the print process. Unfortunately, you can't prefeed paper into the slot; instead, you must wait until the take-up motor begins whining and then insert the paper.

On the right side of the printer is the digital, serial communications port for connecting directly to a Casio camera. Getting the Casio DP-8000 to print from the camera can be a tedious process, though, since it involves working in tandem with both the camera menu and the PC's printer menu.

Built into the printer's firmware are a variety of templates that embellish or format the photo image. Once you've settled on the image to print, slipping a sheet of paper into the slot begins the actual printing process.

Printing directly from the camera produces 149-dpi prints, but producing the same image through the PC increases resolution to a full 297 dpi. In practical terms, the difference between the two is slight, except in areas of great detail

Editors' Choice

• Casio DP-8000



When it comes to producing color photographic images, quality

is paramount. With the highest resolution and the sharpest and most natural color output of the five printers we looked at, the Casio DP-8000 is our Editors' Choice for this rapidly evolving market.

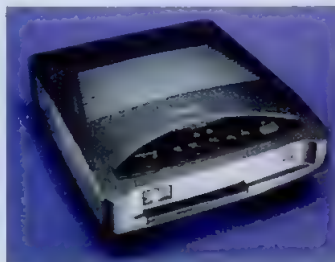
Although none of these five snapshot printers could rival the quality of film and photographic paper, the prints we produced with the Casio DP-8000 were a close second. Not only were minute details visible and clear,

where images that were printed directly from the camera are noticeably softer.

At full resolution, the Casio DP-8000 printed our test files in just over 2 minutes. The prints were by far the clearest and best defined of all our test pictures. The colors were accurate and well saturated, though some detail was occasionally lost in the highlights.

The ribbon cartridge slips into a slot on the left side, and although the top is sealed, paper jams can be removed by opening a flap on the bottom of the printer. There's no error light or audible warning when the printer ribbon is worn out, which means that you may waste a sheet of paper before discovering that you need to install a fresh cartridge. Ironically, when attached to a Casio camera, the camera's LCD screen tells you to replace the cartridge.

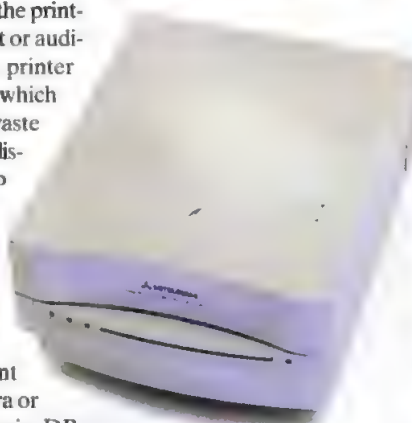
Whether it's to print directly from the camera or from your PC, the Casio DP-8000 should be an integral part of your digital darkroom.



Mitsubishi Electronics America Mitsubishi CP-D1

Mitsubishi gives the digital photographer the best of both worlds with its snapshot printer, the Mitsubishi CP-D1. You get the same print engine as the company's professional models use and a foolproof print system that works as simply an on/off switch.

Although the Mitsubishi CP-D1 was the quietest printer in our roundup, it was the only printer whose driver didn't in-



The Mitsubishi CP-D1 is simple and quick, in equal parts.

but colors were consistently well-saturated and natural-appearing.

The Casio DP-8000 provides two unique bonuses: It is the only one of these five printers to provide feedback on the printing process via its bidirectional parallel port. And you can print either via your PC or by using the Casio DP-8000's digital communications port to connect directly to a variety of Casio digital cameras. Going from camera to printer can take some getting used to, though, and with the camera you sacrifice some of the printer's exceptional resolution.

With prints that are nearly double the size of the Casio DP-8000's, Vivitar Corp.'s ViviPrint DigiPhoto is worthy of honorable mention. At 4 by 6 inches, the prints are not of as high quality as those of the Casio DP-8000, but they include a protective plastic laminate coating that should protect pictures from fingerprint smudges and damage from sunlight.

clude even rudimentary color-correction capability. What distinguishes the Mitsubishi CP-D1 is the extra menu that pops up when you click on the print



Mitsubishi CP-D1
Street price: \$500
Requires: Parallel port
Mitsubishi Electronics America Inc.
Imaging Products Division
Oypress, CA 940-943-2515
fax: 714-238-0330
web: kyoto-inet.or.jp/org/pep-m
Circle 412 on reader service card

First Looks

SUMMARY OF FEATURES

Snapshot Printers: Side by Side

	PC MAGAZINE EDITOR'S CHOICE				
■ YES ■ NO	Casio DP-8000	Mitsubishi CP-D1	Panasonic TruPhoto	Sony DPP-M55 Digital Color Photo Printer	Vivitar ViviPrint DigiPhoto
Products listed in alphabetical order					
Street price	\$400	\$500	\$390	\$500	\$400
Size (HWD, in inches)	2.8 x 9.8 x 12.0	4.5 x 7.9 x 11.0	3.0 x 10.0 x 12.0	2.5 x 11.0 x 9.5	4.3 x 9.5 x 7.5
Weight (pounds)	5.3	6.8	5.5	5.5	7.0
Type	Dye sublimation	Dye sublimation	Thermo-Autochrome	Dye sublimation	Dye sublimation
Resolution (dpi except as indicated)	On the PC, 297; on the QuickView camera, 149	149	144 (pixels per inch)	144	203
Paper feed	Manual	Manual	20-sheet tray	Manual	Manual
Print size (inches)	3.2 x 4.3	3.3 x 4.9	3.5 x 5.0	3.3 x 4.4	4.0 x 6.0
Paper size (inches)	4.0 x 5.8	3.9 x 5.9	4.0 x 6.0	3.9 x 5.5	4.0 x 7.0
Cost per print	80 cents	80 cents	75 cents	90 cents	97 cents
Digital camera input	■	■	■	■	■
Infrared port	■	■	■	■	■
Runs on a PC/Macintosh	■ ■	■ ■	■ ■	■ ■	■ ■

command. Depending upon the option selected, the printer is capable of creating 1, 2, 4, 16, or 25 images on either a single sheet of paper or special sticker stock. The latter makes postage stamp-size (or smaller) peel-off images that can be affixed to documents, CDs, kids'

notebooks, or floppy disks.

The unit's images exhibit excellent color fidelity, brightness, and saturation. Even when you factor in how long it takes to click on the additional print command, Mitsubishi CP-D1 had the second fastest print time of the bunch. Images, however, lack crisp, sharp detail, which is not surprising in light of the printer's 149-dpi resolution.

Loading the ribbon cartridge is a snap: Open the hinged top and pop it in. Each sheet of paper is prefed in a way that makes skewing unlikely. There are four status lights on the front of the printer: Power, Ready, Print, and Error.

Quick, easy, and versatile, the Mitsubishi CP-D1 stresses ease of use over photo quality.

No fuss, no muss, with the Panasonic TruPhoto.



Panasonic Interactive Media

Panasonic TruPhoto

Drawing upon exotic technology, the Panasonic TruPhoto, from Panasonic Interactive Media, didn't measure up to the other four snapshot printers in this group. It was not only the slowest printer, it produced the lowest-quality prints and was troublesome at times.

Based on Fujix's Thermo-Autochrome technology, the TruPhoto uses paper that is mildly light sensitive, so handling it requires an extra degree of care. You have to keep the paper out of bright light, store it in a cool dry place, and return unused sheets to the original bag if you won't be using them anytime soon.

The TruPhoto was the only printer in this group that came equipped with an automatic paper feeder. Its flip-out tray can accommodate 20 sheets at a time, in addition to an included protection sheet, which should be placed on top of the paper stack.

The stylish, navy-blue printer has two control buttons (on/off and online) and three status lights: Power,

Print Ready—which blinks while printing—and Out of Paper—which blinks to indicate a paper jam. Lifting the paper tray exposes the paper path, making it easy to clear jams. At the rear of the printer is a fold-up tray where finished prints are deposited.

The TruColor was no noisier than the other printers, but it was the slowest by a wide margin. It also produced the lowest-quality prints. Although details were well defined, images were overly contrasted and displayed a bothersome color shift toward blue. And the TruColor blew out highlights that the other printers managed to reproduce accurately.

Although the pictures we printed using default values were unacceptable, we were able to produce much more satisfactory images by adjusting the RGB values and brightness/contrast controls, which are available in the TruPhoto's printer driver. Also included are a median filter, as well as smoothing and outlining (sharpening) options.

You can even print images in a variety of monochrome colors—an option that is unique to the TruPhoto. And Panasonic is the only company to bundle an image-editing program, in this case MGI's PhotoSuite 2.0, with each printer.

If you're not in a hurry and need a sheet feeder with your snapshot printer, the Panasonic TruPhoto may be for you.

Sony Electronics Inc.

Sony DPP-M55 Digital Color Photo Printer

The Sony DPP-M55 Digital Color Photo Printer is a well-constructed, thoughtfully designed, and simple-to-use printer that produces just as easily via a parallel cable as it does through its built-in wireless infrared port.

As with the Mitsubishi CP-D1, the only control on the Sony DPP-M55 is an on/off



Panasonic TruPhoto
Street price: \$480
Requires: Parallel port
Panasonic Interactive Media
Santa Clara, CA
800-726-2746, 408-653-1900
www.truphoto.com
Circle 414 on reader service card

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PC World Reliability & Service Survey—*PC World*, December 1996



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- 32 voice waveable stereo sound card with speakers
- PCI 64-bit 3D video, MPEG, 4MB EDO RAM
- Tool-free minitower or desktop
- Microsoft® Mouse, 104-key keyboard
- Microsoft Windows® 95 and MS® Plus! CD
- Multimedia Xcitement Pak: POD®, Adobe® PhotoDeluxe®, Billboard® Music Guide, Blockbuster Entertainment® Guide and Eraser Turnabout®
- 5-year/3-year Micron Power™ warranty

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- 15" Micron 15F6x, 28dp (13.7" display)
- Microsoft Works 4.0 CD

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- Microsoft Office CDs

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- PCI 32-bit Ultra SCSI Fast-20 controller
- 12X SCSI CD-ROM drive, 3.5" floppy drive
- 100MB Iomega Zip drive
- 32 voice waveable stereo sound card with speakers
- PCI 64-bit 3D video, MPEG, 4MB EDO RAM
- Tool-free minitower or desktop
- Microsoft Mouse, 104-key keyboard
- Microsoft Windows 95 and MS Plus! CD
- Multimedia Xcitement Pak: POD, Adobe PhotoDeluxe, Billboard Music Guide, Blockbuster Entertainment Guide and Eraser Turnabout
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- Microsoft Works 4.0 CD

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- Microsoft Office CDs

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- 9GB Fast SCSI-2 hard drive
- 17" Micron 17F6x, 28dp (15.8" display)
- Microsoft Office CDs

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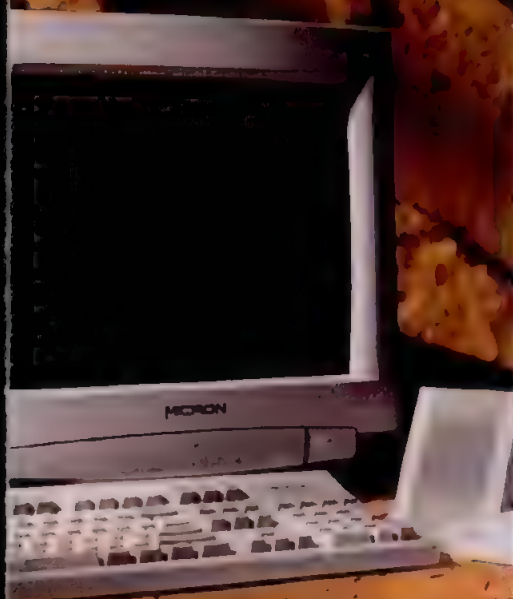
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With Intel 166MHz Pentium processor with MMX subtract '100



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Intel 200MHz Pentium processor

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- America Online and CompuServe trial memberships
- PCI 64-bit 3D video, MPEG, 2MB EDO RAM
- 17" Micron 17FGx, 26dp (15.8" display)
- Tool-free minitower or desktop
- Microsoft Mouse, 104-key keyboard
- Microsoft Windows 95 and MS Plus! CD
- Microsoft Works 4.0 CD
- System soft® System Wizard application for automated problem resolution
- Quicken Financial Pak: Quicken Deluxe 6.0, Quicken Financial Planner, Quicken Parents' Guide to Money, Quicken Family Lawyer and free TurboTax 1996 coupon
- Family Pak: ABC by Dr. Seuss, Thinkin' Things Collection 1, Earthworm Jim and Mechwarrior 2
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- Iomega Zip™ IDE drive with 100MB removable cartridge \$99
- Iomega 6-pack of 100MB Zip cartridges \$99
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NETWORKING OPTIONS

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SERVICE OPTIONS

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- APC Pro7T surge suppressor \$59
- Microsoft Natural Keyboard® \$49
(upgrade from standard keyboard)
- Edventure Pak \$69

¹Upgrade from systems with standard 16-bit stereo sound card

²Requires SCSI host adapter

³V.34 modem includes trial memberships to CompuServe®, Prodigy® and America Online®

⁴V.34 modem includes trial memberships to CompuServe®, Prodigy® and America Online®, requires sound card

⁵Upgrade from systems with standard Micron 17" 17FGx color monitor

⁶Upgrade from systems with standard 64-bit 28" video card

⁷1st year on-site service is available in the United States and in limited areas in Canada from third-party service provider per customer's agreement with provider.

⁸2nd year and 3rd year offerings are available in the United States only.

Options and accessories available with system purchase only.

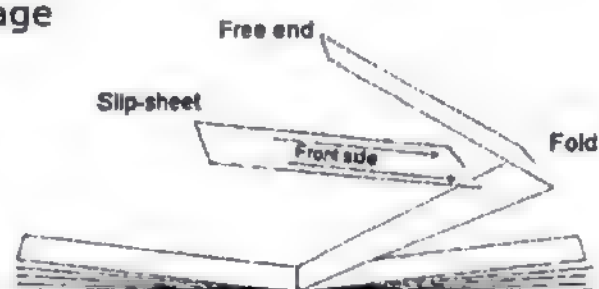


MICRON ELECTRONICS, INC.

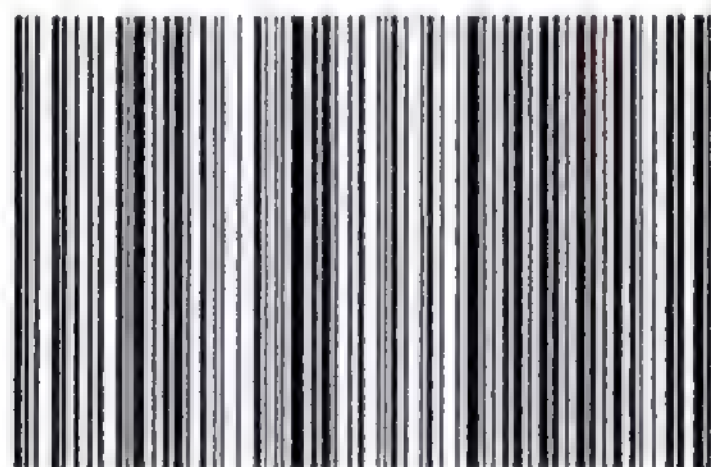
800-707-2329

www.mei.micron.com

1. Open the foldout page
2. Insert this sheet with
 1. Front side touching the free page
 2. Arrow pointing to the fold
3. Slice the folded edge
4. Close the page and slip-sheet



Foldout slip-sheet



GbsSlipSheet-001

Inverted Foldout slip-sheet

Folded edge of the page

1. Open the foldout page
2. Insert this sheet with

1. Front side touching the free page

2. Arrow pointing to the fold

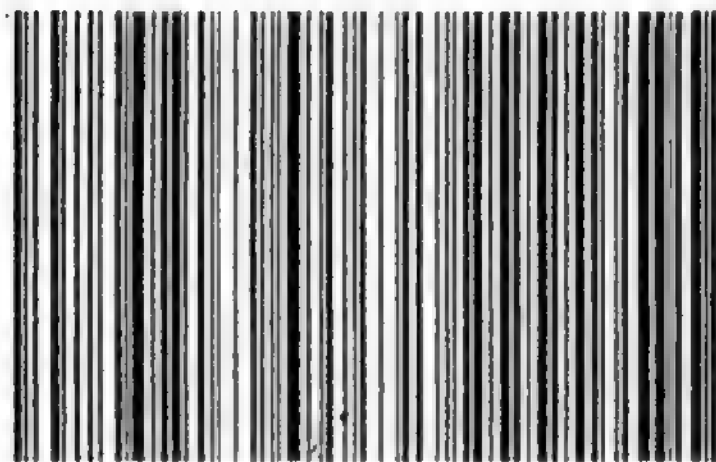
3. Slice the folded edge

4. Close the page and slip-sheet



1. Follow instructions on the other side

Inverted Back



Gbs5lipBack-0018

Back

1. Follow instructions on the other side



TRANSPORT™ XPE

The Advanced Notebook Solution

Ideal for upscale business professionals who want to deliver impressive presentations, the Micron™ TransPort XPE is one of the most advanced notebook PCs available.

- **IMPROVE BUSINESS PRESENTATIONS** with the performance-enhancing Pentium processor featuring MMX technology.
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Mobile Intel Pentium® processor with MMX™

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- Built-in stereo speakers and microphone
- Motorola® Montana 33.6 fax/modem
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- Built-in game port
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- Executive Travel Pak: Greg Norman Ultimate Challenge® Golf, Quicken® Expense®, LapLink®, Focal Point™
- 2 modular expansion bays (hard drive, CD-ROM drive, 3.5" floppy drive, lithium-ion battery)
- Custom nylon carrying case
- Microsoft® Windows® 95 and MS® Plus! CD
- Microsoft Office CDs
- ★ 5-year/3-year limited Micron Power™ warranty

- 150MHz Mobile Intel Pentium processor with MMX
- 32MB EDO RAM (80MB max.)
- 12.1" active matrix color display, 800x600
- 2.1GB removable hard drive

\$4,599

Bus. lease \$154/mo.

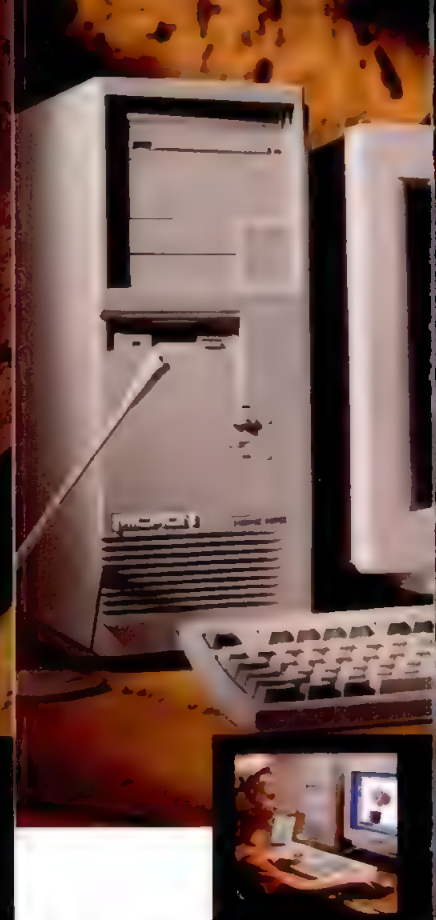
- 166MHz Mobile Intel Pentium processor with MMX
- 48MB EDO RAM (80MB max.)
- 12.1" active matrix color display, 800x600
- 2.1GB removable hard drive

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Bus. lease \$170/mo.

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- 3Com® PCMCIA ethernet adapter, 10-base-T
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- 2nd 1.4GB modular hard drive
- 2nd 2.1GB modular hard drive
- 3GB primary hard drive upgrade
- 16MB EDO RAM upgrade
- 32MB EDO RAM upgrade
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Ideal for the whole family, the Micron Home MPC P166 is one of the most exciting home computing.

- **IMPROVE MULTIMEDIA PERFORMANCE** with the capability for vivid graphics and sharp, smooth sound.
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- **ENJOY EXCITING SOFTWARE** bundle

HOME MPC™ P166

Intel 166MHz Pentium® processor

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- 12X EIDE CD-ROM drive, 3.5" floppy drive
- 16-bit stereo sound and speakers
- 33.6 fax/modem, speakerphone, voice mail
- Microsoft® Phone telephony software
- Internet ready: SPRYNET™ Internet trial membership, Microsoft Internet Explorer™ 3.0
- America Online™ and CompuServe™ trial memberships
- PCI 64-bit 3D video, MPEG, 2MB EDO RAM
- 15" Micron 15FGx, 28dp (13.7" display)
- Tool-free minitower or desktop
- Microsoft Mouse, 104-key keyboard
- Microsoft Windows® 95 and MS® Plus! CD
- Microsoft Works 4.0 CD
- System soft® System Wizard application for automated problem resolution
- Quicken® Financial Pak: Quicken Deluxe 6.0, Quicken Financial Planner™, Quicken Parents' Guide to Money™, Quicken Family Lawyer™ and free TurboTax® 1996
- Family Pak: ABC by Dr. Seuss, Thinkin' Things™ Collection 1, Earthworm Jim™ and Mechwarrior™ 2
- Microsoft Home Pak: Publisher, Deluxe97, Encarta® 97 Encyclopedia, Monster Truck Madness™ and CD sampler
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POWER DESKTOP SOLUTIONS

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- 256KB internal L2 cache, flash BIOS
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- 16-bit stereo sound and speakers
- PCI 64-bit 3D video, MPEG, 4MB EDO RAM
- Tool-free minitower or desktop
- Microsoft® Mouse, 104-key keyboard
- Microsoft Windows® 95 and MS® Plus! CD
- 5-year/3-year Micron Power™ warranty

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- Microsoft Office CDs

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With 2nd Intel 180MHz Pentium Pro processor add \$599*

With Microsoft Windows NT® Workstation 4.0 CD add \$99

* Second processor requires Microsoft Windows NT® Workstation 4.0

MILLENNIA™ PRO2 400 PLUS

Dual Intel 200MHz Pentium Pro processors

- 256KB internal L2 cache, flash BIOS
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- 16-bit stereo sound and speakers
- PCI 64-bit 3D video, MPEG, 4MB EDO RAM
- Tool-free minitower or desktop
- Microsoft® Mouse, 104-key keyboard
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- Built-in stereo speakers and microphone
- 2 infrared ports, 1 front, 1 rear
- S-video and NTSC-video outputs
- Management Pak: MPEG Arcade™ Player, ASAP WordPower™, Quicken® SE, SPRYNET™ Internet trial membership
- Executive Travel Pak: Greg Norman Ultimate Challenge® Golf, Quicken® ExpensAble™, LapLink®, Focal Point™
- 2 modular expansion bays (hard drive, CD-ROM drive, 3.5" floppy drive, lithium-ion battery)
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- 1.4GB removable hard drive

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- 3Com® PCMCIA ethernet adapter, 10-base-T
- Samsonite® leather carrying case upgrade
- 2.1GB primary hard drive upgrade

- 2nd intelligent lithium-ion battery
- 2nd 1.4GB modular hard drive
- 2nd 2.1GB modular hard drive
- Car adapter
- 16MB EDO RAM upgrade
- 32MB EDO RAM upgrade



MICRON EXECUTIVE DESKTOP PACKAGE:
Includes matching black 17" monitor,
mouse, mousepad and keyboard

ECONOMICAL DESKTOP SOLUTIONS

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Intel 166MHz Pentium® processor

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- PCI 64-bit 3D video, MPEG, 2MB EDO RAM
- Tool-free minitower or desktop
- Microsoft® Mouse, 104-key keyboard
- Microsoft Windows® 95 and MS® Plus! CD
- Microsoft Works 4.0 CD
- 5-year/3-year Micron Power™ warranty

- 16MB EDO RAM
- 2.1GB EIDE hard drive
- 15" Micron 15FGx, .28dp (13.7" display)

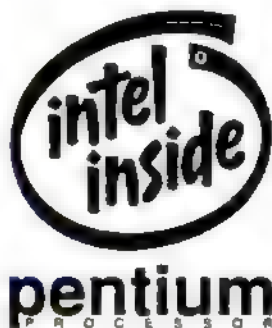
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Bus. lease \$54/mo.

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- 4.1GB EIDE hard drive
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\$2,099
Bus. lease \$71/mo.

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Warranty & Support

- 5-year limited warranty on microprocessor and main memory
- 3-year limited parts-only system warranty
- 1-, 2- or 3-year optional on-site service agreement for Micron desktop and server systems
- 30 days of free Micron-supplied software support for Micron desktop systems; 3 optional network operating system incident resolutions included for Micron server systems
- 30-day money-back policy
- 24-hour technical support

The foregoing is subject to and qualified by Micron's standard limited warranties and terms and conditions of sale. Terms and conditions of sale may vary for special configurations. Complete limited warranties may be obtained on our Website or by calling Micron.

First Looks



button. There are four status lights on front: Ready/Receiving Data, Printing, Ribbon Out, and Feed Paper. The Sony DPP-M55 has a manual paper feed, but the company offers an optional \$99 automatic 20-sheet feeder that slips into a flap below the feeder slot.

Printing directly from the Sony DSC-F1 camera is controlled completely from the camera, not the printer. The camera's infrared window must be within 6 inches of the printer's left-front infrared port; we found that the closer the two were the more trouble-free the transmission.

The camera moves data at a relatively sluggish 38 Kbps, so it takes about 50 seconds to upload a single 640-by-480 image file. Once the image is received, the Sony DPP-M55 takes a little over 1 minute 40 seconds to complete a print. On the other hand, when connected directly to a PC the

Speed is of the essence with the Sony DPP-M55.



Sony DPP-M55 was the fastest printer of the five we tested.

Along with basic RGB color corrections, the Sony DPP-M55's driver also includes sharpness and density sliders. The printer's images displayed an extra degree of sharpness and crispness compared with the others. Colors were vibrant and richly saturated, but they were also less natural-looking, though not to the point of being objectionable or unacceptable. Unfortunately, the Sony DPP-M55 left a noticeable scratch on every print we produced.

But if you need your prints right away, the Sony DPP-M55 delivers.

Vivitar Corp.

ViviPrint DigiPhoto

The ViviPrint DigiPhoto, from Vivitar Corp.—essentially an OEM version of Fargo Electronics' Fargo FotoFUN!—is like the phoenix rising from its own ashes. The DigiPhoto solves many of the problems we encountered with the Fargo printer when we first reviewed it (First Looks, November 7, 1995).

The DigiPhoto is spartan to say the least. The only user-adjustable controls on the DigiPhoto are the on/off button and a clear button. When

the two front status lights are on, you are ready to print; when one or both is blinking, you have to refer to the manual to figure

out what the problem is. An improved paper slot makes feeding sheets easier than it was during our earlier experience with the FotoFUN!, and the process was virtually jam-free.

Unlike with the four other dye-sublimation printers in this story, you feed paper with printing surface face down. You can either insert paper when the transport motor turns on or preload a sheet by pressing the clear button and feeding it in. If you choose the latter method, you don't have to wait until the printer is ready, but leaving a preloaded sheet in too long can cause it to curl and jam.

And unlike the other dye-sublimation printers, which use fast-loading mess-free cartridges, the DigiPhoto has a ribbon that consists of two plastic spools, which spring-load onto front and back bobbins. Installing the ribbon spools is slightly more time-consuming than popping in a cartridge, and it's possible to install them incorrectly—backwards or upside down, for example. A helpful illustration inside the printer, however, shows the correct placement.

The hinged

top lifts up for easy and complete access to the printer's mechanical components, which makes clearing jams or replacing ribbons quite easy.

At 4 by 6 inches, the DigiPhoto's print area is larger than that of the other printers we tested; in fact, it is nearly twice the size of the image produced by the Casio DP-8000. The DigiPhoto is also, the only unit capable of printing a borderless print along the width of the paper. But the DigiPhoto was the second slowest printer of the group, which—since it makes a fourth pass to emboss a protective laminate on the prints—was to be expected.

The DigiPhoto reproduced the best highlights and colors of these five printers. Only the Casio DP-8000, with one-third more resolution, had crisper and cleaner details.

If you're looking for the largest snapshots from your PC, check out Vivitar's ViviPrint DigiPhoto.



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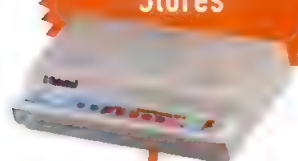
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First Looks

UPGRADES

An MMX Kick in the Pants

The Pentium OverDrive with MMX boosts the output of Pentium PCs by about 30 percent.—By Sebastian Rupley

Intel is out to MMXize a large segment of the computing world with its Pentium OverDrive Processor with MMX. Designed for owners of midrange Pentium PCs who want extra processing power, the OverDrive with MMX provided an improvement in performance that ranged from 24 to 36 percent. But at as much as \$499 per chip, this processor upgrade may be harder to justify than earlier, less expensive OverDrive chips were.

The OverDrive with MMX chip has been designed to upgrade 75-, 90-, and 100-MHz Pentium systems to faster clock speeds. The chip is a dead ringer for the Pentium processor sold with new PCs. It is built on a 0.35-micron semiconductor process, has 32K of internal cache—twice that of a non-MMX Pentium CPU—and includes Intel's MMX multimedia extensions.

The chip can boost a 75-MHz Pentium computer to 125-MHz. Likewise, 90-

MHz and 100-MHz systems can increase to 150 MHz and 166 MHz, respectively.

QUICK AND EASY

The upgrading process itself was painless: We were done in less than 5 minutes, and the hardest part was opening the system's case and getting to the CPU socket. The chip includes an on-board voltage regulator and fan, and it requires no PC-based software to operate.

We tested the OverDrive with MMX on a Hewlett-Packard Vectra XU 5/90 system and saw significantly better performance results across the board. As is to be expected, the most dramatic performance improvements we saw were on processor-intensive tasks. Our CPUmark₁₆ test score, for example, was 36 percent better than with

our 90-MHz Pentium-based system. Similarly, results on our CPUmark₃₂ tests rose 32 percent after we installed the MMX upgrade. This means that performance improvement from the OverDrive with MMX upgrade is slightly better with 16-bit applications than with 32-bit programs.

Due to the interaction of

game. In addition, you can get a second title free from a list that includes *The Ultimate Human Body 2* and *Visual Home*, among others.

IS IT FOR YOU?

Is your system appropriate for an MMX upgrade? You can check with Intel, which provides a list of those systems approved for an upgrade to this or any other Intel OverDrive chip. The information is available at Intel's Web site or via Intel's fax-back line.

At from \$399 to \$499 for an OverDrive with MMX upgrade chip (depending on the speed of the base PC), Intel is following its tradition of introducing OverDrive upgrade

chips at relatively high prices. In the past, prices for upgrade chips have dropped dramatically over time, so some users may want to wait a while before buying.

Those interested in the upgrade should consider that fully stocked MMX Pentium systems have fallen below the \$2,000 mark, so full MMX systems represent competition for the OverDrive with MMX upgrade. But our tests show that this upgrade provided a significant boost, and users of 75-, 90-, and 100-MHz Pentium systems should take a close look at this upgrade option, especially as the price starts to drop.

Pentium OverDrive Processor with MMX. List price: For 75- and 90-MHz Pentium PCs, \$399; for 100-MHz Pentium PCs, \$499. Requires: Upgradable 75-, 90- or 100-MHz Pentium PC. Intel Corp., Santa Clara, CA; 800-538-3373; fax-back, 800-525-3019; www.intel.com/proc/overdrive. Circle 410 on reader service card.



IN GEAR: Intel's Pentium OverDrive Processor with MMX boosts the output of a midrange Pentium PC.

many other PC components, performance gains on applications were less gratifying. Our suite of business applications that make up the Winstone 97 benchmark test ran 24 percent faster after the upgrade, placing the upgraded system at about the level of a 150-MHz Pentium PC.

GAMER'S PARADISE

The true benefits of an MMX upgrade won't be fully realized until there are more titles that can take advantage of Intel's MMX specification. So don't expect your applications suite to get much help from MMX. But video, games, and other multimedia-intensive applications will see markedly better performance. To date, a smattering of games, image editors, and other software products have appeared for MMX, with many more expected by midyear.

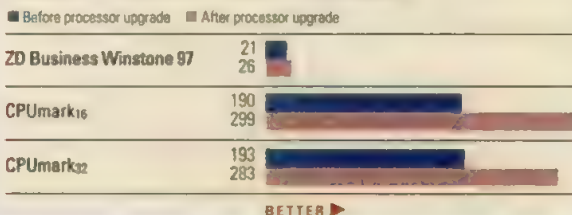
The OverDrive with MMX package comes with a CD-ROM disk that includes *Rebel Moon Rising*, an MMX-ready

BENCHMARK TESTS

Pentium OverDrive with MMX

Intel's Pentium OverDrive Processor with MMX yielded impressive performance increases on our processor-intensive CPUmark tests, with the biggest gain occurring for 16-bit code. Application tests yielded lower performance increases because of the interaction of other system components.

We tested a 90-MHz Pentium-based Hewlett-Packard Vectra XU 5/90 before and after installing the Intel Pentium OverDrive Processor with MMX.



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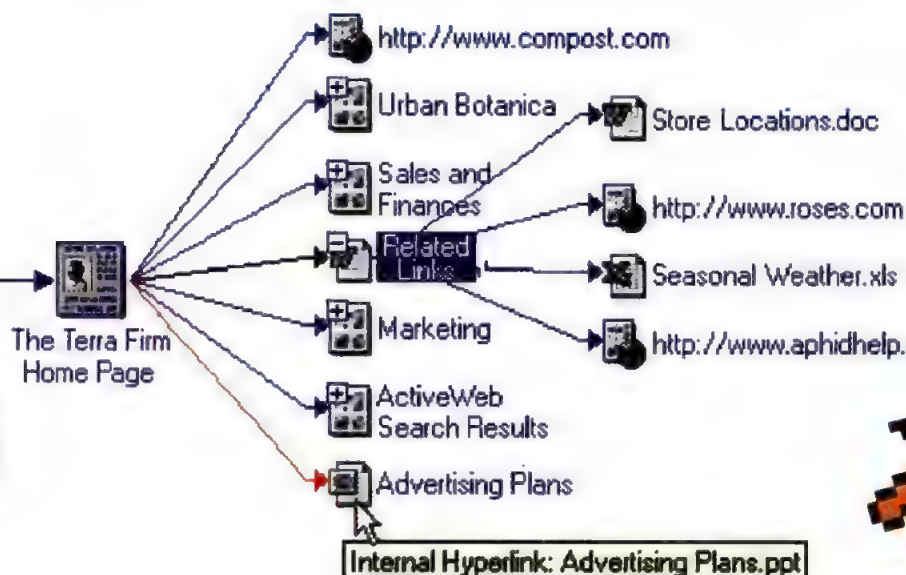
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First Looks

INTERNET VIDEO

Web, Front Row Center

Web Theater customizes video for the Web.—By Jan Ozer

VXtreme Web Theater offers scalability and makes it easy to perk up a Web site with video. But the Java-based client is sluggish and a bit unstable, which could prove frustrating for twitchy Web surfers.

The VXtreme Web Theater family has three major components: Producer, which includes both capture/encoding and authoring modules; Server, which administers the delivery of video files; and the user-side Client. A typical setup for running as many as five simultaneous video streams costs \$1,995; the Client software is free.

Web Theater's codec includes elements of wavelet compression and discrete cosign transform (DCT) technology, which is used in JPEG. The company's proprietary file formats can be created only with VXCapture, the Windows 95 capture/encoding module. This straightforward program works with any Video for Windows capture card; it also converts existing .AVI files.

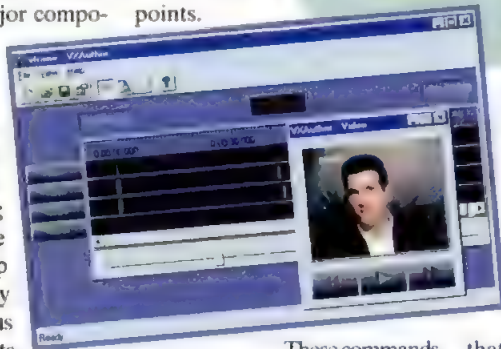
TWO-IN-ONE DELIVERY

VXCapture lets you customize video resolution and bandwidth, with settings for 28.8- or 56-Kbps at a 160- by 120-pixel window, or 128-, 256- and 512-Kbps playback of 320- by 240-pixel videos. You can configure a file to support multiple bandwidths, creating a video, for example, that works with an ISDN and a dial-up modem connection.

Incorporating video files into your Web page is accomplished with the Embed command or by using VXAutor to create Live Screen HTML pages. VXAutor uses a time line approach for adding tickers or text messages,

which scroll under the video window, a table of contents that lets users jump to selected points in the video, and URL flippers, which call up HTML pages at specified points.

TO THE EXTREME:
VXAutor's time-line approach to manipulating video creates an impressive kiosklike effect for a Web page.



These commands create an impressive kiosklike effect for a Web page.

Web Theater's Server (available for Silicon Graphics IRIX 5.3, Sun Solaris 2.5, and Windows NT) monitors each connection's bandwidth and adjusts the outbound video stream to optimize quality and avoid audio breaks. While the Server uses the Universal Datagram Protocol (UDP) as its primary transmission mechanism, it also supports the more firewall-friendly TCP.

At present, Web Theater's Client is available for Windows 95 and Windows NT, and as an add-on for Microsoft Internet Explorer 3.0 and Netscape Navigator 2.0. The Client is feature-rich, with Java applets supplying VCR-like controls and a slider bar for navigating through video. Users can choose between TCP and UDP, and select such view playback statistics as throughput and lost-packet information.

We tested Web Theater and its components on a Pentium/133 PC running Windows 95 with 16MB of RAM. VXCapture was simple to operate and fairly speedy, encoding a 45-second,

160- by 120-pixel video file for 56-Kbps delivery rate in 5 minutes, 41 seconds. Using VXAutor was a bit more complex; we augmented the raw video with titling, URL flipping, and content tables.

The server side of Web Theater was set up on a Solaris 2.5 system at MindSpring, an Atlanta-based

Internet service provider that hosts business-oriented Web sites. Installation took the better part of an afternoon, and

the server program required five TCP ports. Instead of working from HTML tags like many other media servers, each Web Theater file must be registered with the server, which can be a headache.

Using the test videos that we encoded both for 28.8- and 56-Kbps delivery (at 160- by 120-pixel resolution) and for 128- and 256-Kbps (at 320- by 240-pixel resolution), we compared Web Theater's output with that of VDO Net's VDOLive and Vivo Software's VivoActive. For 160-by-120 video, the product produced acceptable video that exhibited a bit of blockiness and Gibb's effect, which are by-products of using DCT compression. At 320-by-240 resolution, however, Web Theater's videos became

quality degraded and frame rate dropped at 28.8 Kbps; audio breaks were almost nonexistent. This scalability lets developers provide the best of both worlds: better quality to high-bandwidth users and the ability to service slower-speed customers.

At T1 bandwidths, Web Theater options—tickers, URL flipping, and table of contents, for example—worked well. But at low bandwidths, such events frequently fell behind the video, with several HTML pages delayed until after the video finished playing.

GO-SLOW JAVA

The biggest problem with Web Theater, however, was that the Java-based Client took as long as 25 seconds to load when playing a video file from disk, longer when playing over the Internet, and longer still with files using URL flipping; by comparison, VDO-Live and VivoActive each took about five seconds to load.

More annoying, areas of the interface show up as amorphous blocks while the software loads. At lower bandwidths, the Client was slow to respond to stop and pause commands, and it was slightly unstable, crashing IE and Navigator several times on three different computers.

Web Theater might be well served by the release of a



BETTER QUALITY:

A 160-by-120 resolution, video in Web Theater (right) looked better than in VDO Net's VDOLive (left) and Vivo Software's VivoActive (center).

choppy and somewhat distorted, ranking behind those of other video-delivery mechanisms.

Playback testing confirmed that a Web Theater file could service both a 56- and a 28.8-Kbps connection. Compared with data throughput at 56 Kbps, video

bare-bones

non-Java viewer to complement Web Theater's impressive scalability.

VXtreme Web Theater. List price: For 5 simultaneous streams, \$1,995. Requires: 8MB RAM, 15MB hard disk space; Microsoft Windows 95 or Windows NT. VXtreme Inc., Palo Alto, CA; 415-614-0700; fax, 415-614-0710; www.vxtreme.com. Circle 406 on reader service card.

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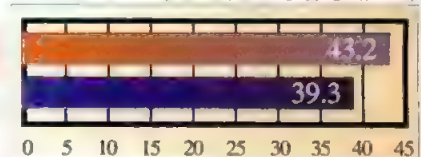
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Source: Computer Shopper Winstone. March 1997 issue.

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First Looks

WEB BROWSERS

16-Bit Browser Battles

Microsoft and Netscape bring Java to their Windows 3.1 browsers.—By Scot Finnie

With the Microsoft Windows 95 versions of Netscape Navigator 3.0 and Microsoft Internet Explorer 3.0 old hat and their replacements around the corner, it's time Windows 3.1 users caught up and got in on the Java act. On paper, the 16-bit Windows 3.1 versions of the free Microsoft Internet Explorer 3.0a for Windows 3.1 and the \$50 Netscape Navigator 3.01 for Windows 3.1 appear to be two peas in a pod. But upon closer inspection, we discovered that the similarities between these two browsers were only skin deep.

We looked at the prerelease Java Virtual Machine (VM) versions of these two browsers as well as their latest non-Java versions and found that they were acceptably reliable for day-to-day Web work. Both programs deliver and display pages that use the most current HTML specifications.

After we connected to ten well-known Web sites using

the Windows 95 versions of the browsers scored a perfect ten of ten.

HERE AND NOW...

Frankly, neither of these Windows 3.1 browsers is likely to earn a reputation as a Net speed demon. Both are faster than previous versions—IE had a slight performance edge over Navigator—but these browsers lag behind their Windows 95 counterparts.

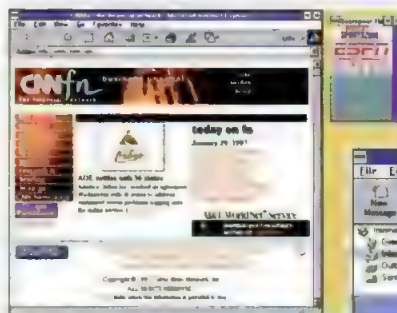
Navigator for Windows 3.1 generally displays Web pages the same way its Windows 95 cousin did. By contrast, if you look closely, you'll see variations in the way the 16-bit variant of IE displays pages compared with its 32-bit cousin. For example, IE for Windows 3.1 displays some transparent,

animated .GIF images incorrectly with flashing backgrounds that can divert atten-

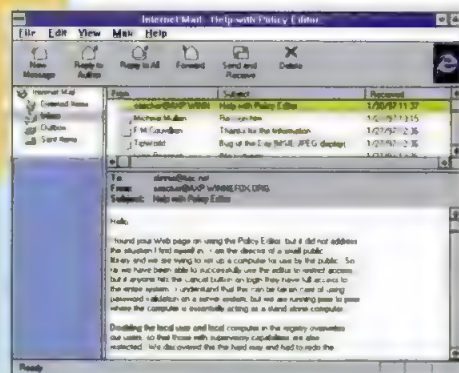
WEB TALKIES: The inclusion of CoolTalk, the Net phone and collaboration tool, makes Navigator more like groupware. Java is standard equipment.

the Windows 3.1 version of IE does a better job than the Windows 95 version.

Navigator has had an automatic proxy setup for some



HOT JAVA: Internet Explorer 3.0a with Java pours a full cup of content, and the new Internet Mail module emulates its 32-bit cousin and even adds simple support for multiple users.



time, but IE plays catch-up by offering to establish a proxy server for you automatically. This gives a company's IT staff or an ISP a way to configure a long list of browser and connection settings remotely.

After using it extensively, we found that IE's 16-bit Internet Mail has a greater variety of configuration options than its predecessor. And it's easier to use than Navigator's Mail module. IE's mail client extends support for multiple users, and a user can launch it as a standalone program.

Microsoft offers four flavors of IE for download, including options with an included TCP/IP stack and a dialer for Windows 3.1 systems; these versions even have the familiar Internet Connection Wizard. By contrast, Navigator's TCP/IP stack and dialer are included only in the retail package of Navigator Personal Edition. One thing Navigator offers that IE does not is a 16-bit version of the Internet phone and whiteboard collaboration tool, CoolTalk.

...AND WHAT'S TO COME

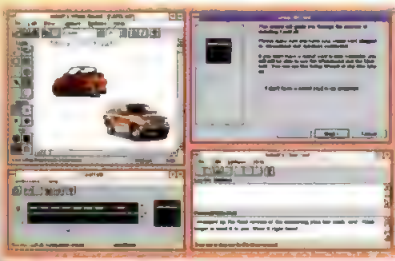
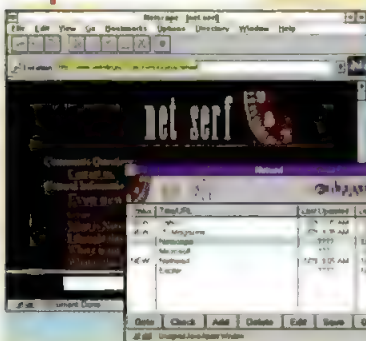
Microsoft and Netscape have different plans for their next-generation browsers. Netscape isn't planning a final version of Navigator 3.01 with Java for Windows 3.1 at all. Rather, expect to see a 16-bit Java VM included in Navigator 4.0 for Windows 3.1. The first public beta of that pro-

gram should be available soon.

Many of the changes Netscape plans for its next-generation 16-bit browser are cosmetic. You'll see support for HTML 3.2, the Object tag, and Level 1 Cascading Stylesheets. Also expect to see the ability to use absolute positioning and layering, as well as automatic installation for plug-ins. The one thing you probably shouldn't expect is support for ActiveX components in Navigator 4.0. And while NCompass Labs provides ActiveX support for Navigator with ScriptActive, the plug-in isn't available for Windows 3.1 or the Macintosh.

By contrast, Microsoft's upgrade plans include a 16-bit IE 3.01 for Windows 3.1, which will be released around the same time as the public beta of Navigator 4.0 for Windows 3.1. This version of IE will incorporate the final version of the Java VM and support for HTML 3.2, the site rating system—PICS—and Cascading Stylesheets.

Microsoft has plans to post a public beta of IE 4.0 for Windows 95 before spring, with its Windows 3.1 version to follow about a month later. But IE 4.0 is so heavily integrated into the Windows 95 and Windows NT desk-



the VM versions of these browsers, each properly displayed eight of ten popular Java content examples; the two browsers encountered different trouble spots. By contrast,

now IE provides the easiest and most intuitive trip through the Web. But we still prefer Navigator's status read-outs for download progress, even though by showing data flow

tops that it's unclear how many of its better features will translate to Windows 3.1.

All in all, these are two competent Windows 3.1 Web browsers that run neck and neck. Although Netscape Navigator 3.01 for Windows 3.1 has its merits, IE's slightly faster operation, more versatile mail and news modules, customizable toolbar, and easy connection setup give it an edge in the rapidly evolving world of the Web. And it's free. **Microsoft Internet Explorer 3.0a for Windows 3.1.** List price: Free. Requires: 4MB RAM, 3MB hard disk space; Microsoft Windows 3.x or Windows NT 3.51. Microsoft Corp., Redmond, WA; 800-426-9400, 206-882-8080; www.microsoft.com. Circle 407 on reader service card. **Netscape Navigator 3.01 for Windows 3.1.** Street price: \$50. Requires: 4MB RAM, 3MB hard disk space, Microsoft Windows 3.x. Netscape Communications Corp., Mountain View, CA; 415-937-3777; www.netscape.com/comprod/product/navigator/version_3.0/index.html. Circle 408 on reader service card.

INTERNET UTILITIES

HTML in a Snap

WordToWeb converts Word 95 and or Word 97 documents into instant HTML files.—By Melissa J. Perenson

Solutionsoft's \$279 WordToWeb goes beyond the capabilities found in Microsoft Word 95 and Word 97 by automating the process of converting hundreds of Word documents into fully formatted HTML files.

There are separate versions of the software for Word 95 and Word 97, and you must install the included Version 2.03 of Microsoft Internet Assistant if you don't already have it. The software installation was uneventful, although if you run Word from a network, you have to load an extra .DLL file into the network's template directory.

Getting started with a new

WordToWeb project is as simple as clicking on the WordToWeb icon, which launches Word and Word-

three page-layout templates: a wide-left-margin design with headlines on the left; a horizontally split screen design; and the standard full-page design.

WordToWeb has design options that help first-time Web creators set up a keyword index, specify which heading levels appear in the project's

EASY WRITER: WordToWeb's Template Gallery lets you choose the format of your Web page.

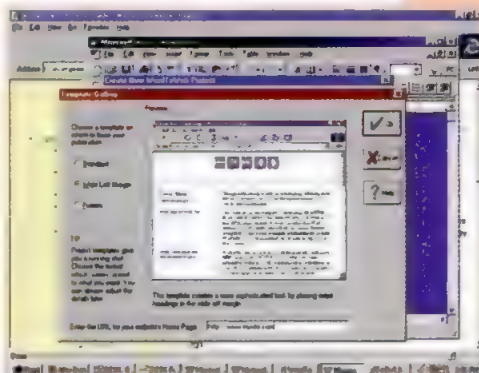


table of contents, and set such HTML page properties as font, background, and color.

We particularly liked the program's control over more complex settings. You can easily automate such tasks as specifying whether your source document is broken down into multiple

ToWeb simultaneously. You are then prompted through the process of configuring your project's attributes and properties. After you've named your project, you can choose from among

HTML files, setting the auto-naming conventions, determining how your existing text formats are converted to HTML, and editing the navigation buttons, and page and table formats.

After WordToWeb converts embedded graphics, it generates the HTML document and launches your browser for previewing the results. The handy context-sensitive help feature provides detailed answers to your questions in a how-to format. Unfortunately, the software always tries to turn a URL into a live link—regardless of its context. To correct this, set the HTML cross-references manually or reconfigure the program's auto-linking feature.

WordToWeb picks up where Microsoft Internet Assistant leaves off, making Word an Internet content machine.

WordToWeb. List price: \$279. Requires: 8MB RAM, 15MB hard disk; Microsoft Windows 95 or Windows NT; Microsoft Word 95 or Word 97. Solutionsoft, Sunnyvale, CA; 888-765-6738; fax, 408-736-4013; www.solutionsoft.com. Circle 409 on reader service card.

Browsers for Macs—Old and New

Mac users who haven't tried Microsoft Internet Explorer 3.0 for the Macintosh are missing out on one of the best ways to use a Mac to unlock the Web's secret treasures. Not only does IE for the Mac support just about every major Web standard, but it also runs Java applets via either Microsoft's or Apple's Java implementation.

IE for the Mac has specifications similar to those of its Windows 3.1 sibling. It can handle ActiveX, Cascading Stylesheets, HTML 3.2, Internet Config, JavaScript, Open Transport, and PICS, the Web site ratings system. In addition, IE for the Mac also provides cross-platform multimedia support—about equal to what Netscape Navigator for the Macintosh provides—a customizable toolbar, and Microsoft Personal Web Server. The only hitch: You need a PowerMac to run IE 3.0.

If you have an older Mac system, Netscape Navigator 3.01 may be your best

bet, because it works well on both 68K and PowerMac systems. A bit longer in the tooth than IE 3.0, Navigator 3.01 for the Mac supports fewer advanced HTML features, and it lacks a just-in-time Java compiler. On the other hand, Navigator includes extensive Java support, Internet Config, JavaScript, LiveConnect, Live3D, Open Transport, plug-ins, and broad multiplatform multimedia features.

Like the Windows 3.1 versions of these browsers, the Mac versions run neck and neck, but they are far more robust than the Windows 3.1 versions.

IE for the Mac is a freebie (www.microsoft.com/ie); Netscape charges \$50 for its Mac browser (www.netscape.com/). It would be tough to go wrong with either one, but until the 4.0 version of Netscape Navigator ships, Microsoft Internet Explorer 3.0 for the Macintosh has a leg up.—SF

First Looks

INTERNET UTILITIES

The Easy Route to ActiveX

Need ActiveX components for your Web site? Visual Basic 5.0, Control Creation Edition delivers.—By Scot Finnie

Microsoft Visual Basic 5.0, Control Creation Edition (CCE) is the ultimate test drive: Not only do you get to drive it off the lot without the salesman, but you don't have to return it or even pay for it. CCE points the way to how we will create ActiveX controls in the future and gives us a tantalizing peek at VB 5.0. We tested CCE's public beta, which had some minor quirks; Microsoft intends to post a final version in the next several months.

CCE's only up-front cost is the inconvenience of a 7MB download. But that is less significant than the fact that CCE is the first Visual Basic release that can create ActiveX controls. It is also the first development environment that lets you create an ActiveX control as easily as you build a Visual Basic program. Before this release, the far more demanding Visual C++ environment was virtually the only game in town.

In an attempt to increase productivity, streamline procedures, and cut back on repetitive tasks, Microsoft rebuilt Visual Basic. You'll find a much improved interface, which includes wizards to help you with such tasks as defining an object's properties, setting events, and building property sheets. CCE also includes a pop-up object model and pop-up syntax references, improved debugging tools for tracking several types of operations, and a new form-layout screen.

A big payoff comes from CCE's ability to open and manage multiple projects. Overall, the Visual Basic environment is well crafted and designed to optimize your productivity.

There are two catches. At

present, you can't use CCE to create standalone .EXE programs or automation servers. For those tasks, you need a commercial version of VB 5.0. The compiled .OCXs that CCE produces are virtually identical to those of Visual C++, Version 4.2, and you can use them in

as 10K to 20K, from scratch. But we found the product much more useful for customizing and combining existing ActiveX controls.

Unlike VB 4.0 applications, VB 5.0 code doesn't require having the Microsoft Foundation Classes (MFC) .DLL libraries on the user's machine. The .CAB CCE control runtime files are available on Microsoft's site for performing automatic in-line downloads or for rehosting on your intranet.

The CCE package isn't designed just for developing Web

launching in Internet Explorer.

As a language, VB 5.0 seems brand new and is like a breath of fresh air. Among other things, it replaces Office 95's many macro and scripting languages. The most interesting language improvement is greater flexibility in programming user-defined events.

One of VB 5.0's best new features is platform-native compiling. (Although CCE also compiles code, it doesn't do so natively, which could elicit performance benefits with some types of VB applications.)

Another VB 5.0 trick is Active Documents. The idea is that an ActiveX-supporting browser is able to access a VB 5.0 application that incorporates a variety of types of content: .CGI, .GIF, HTML, JPEG, and so on. Office 97's Binder offers the same sort of feature. The potential for building VB applications that present and control Web sites has broad implications.

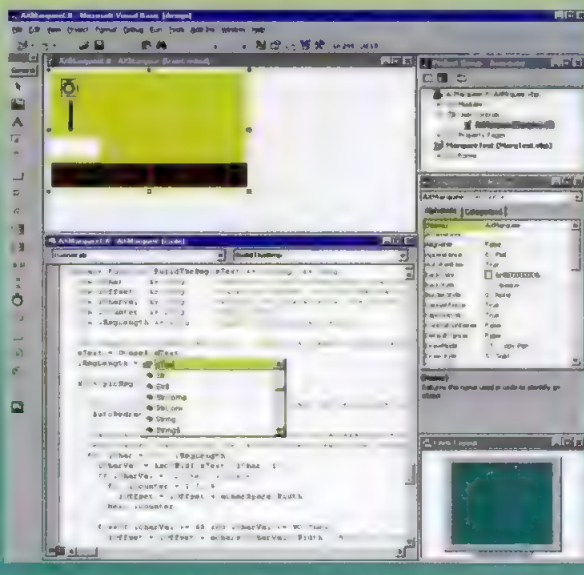
Look for three other versions of VB 5.0, each of which will contain everything in the Control Creation Edition and a good deal more. The Standard, Professional, and Enterprise editions are expected to range in price from roughly \$100 to \$1,000; Microsoft plans to ship them later this year.

Microsoft Visual Basic 5.0, Control Creation Edition, gets high marks from the start. It's free, and for now it's the easiest way to combine existing ActiveX controls and make new ones from scratch. And it's the first in a line of products that will simplify the tweaking and customizing of code, making these tasks an essential part of an increasing number of job descriptions.

Microsoft Visual Basic 5.0, Control Creation Edition. List price: Free. Requires: 12MB RAM, 20MB hard disk space; Microsoft Windows 95, or Windows NT 3.51 or later. Microsoft Corp., Redmond, WA; 800-426-9400, 206-882-8080; www.microsoft.com/vbasic/. Circle 405 on reader service card.

VASTLY IMPROVED INTERFACE: Microsoft Corp. overhauled the main Visual Basic interface from the ground up and in the process streamlined the building of ActiveX controls from

scratch. CCE makes it easy to create controls, like the one for this marquee (left).



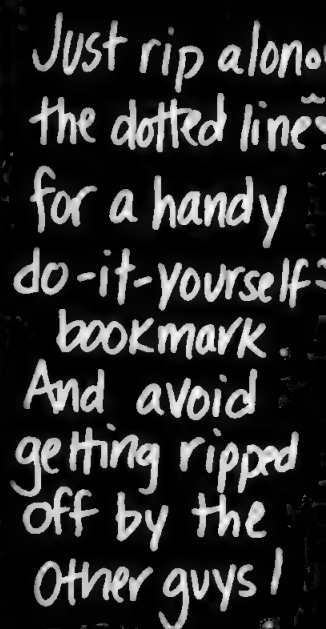
just about any ActiveX host environment, including Access 95, Office 97, VB 4.0, Visual FoxPro, and Web pages accessed with Internet Explorer 3.0 or later.

In addition, there's a one-time price to be paid: ActiveX controls require a virtual machine administered by a 1MB runtime library. Once properly posted, though, the library downloads and installs automatically. CCE builds ActiveX controls, often as small

pages, but that function is one of its chief attractions. The product enables you to build ActiveX controls that create everything from marquees to forms to pop-up menus. During our evaluation, we created a scrolling-text bar that displayed headlines.

Our favorite feature was CCE's setup wizard, which walks you through the process of digitally signing and preparing controls that the .CAB files need for automatic downloading and

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First Looks

SURVEY SOFTWARE

Surveys, the Online Way

Decisive Survey 2.0 facilitates data collection and analysis via e-mail or a Web site.—By Sheryl Canter

The widespread nature of the Internet makes it a natural for distributing and collecting surveys. The newest competitor on the survey playing field is Decisive Technology's \$799 Decisive Survey 2.0, which lets you collect data through e-mail or a Web site.

Decisive Survey is a lightweight compared with Apian Software's Survey Pro and Raosoft's SurveyWin ("PC Survey Says," November 19, 1996). The program is cleanly designed and relatively easy to use, but it's rather limited. Only four response types are supported (Choose one, Choose all that apply, Rating, and Enter text), numeric responses must be entered as text, and Decisive Survey lacks even the most rudimentary data-validation techniques.

The program's built-in library of commonly asked questions, however, can save you some typing when putting a survey together. Once you've constructed your survey, you can deploy it via e-mail, the Web, or both. When you generate Web files, Decisive Survey locks the survey—so it can't be changed by the respondents—and then generates the questionnaire's HTML file, the Perl file for collecting the data, and a README.TXT file for network administrators.

The program also supports Eudora, the Internet e-mail program, and it allows survey respondents to maintain anonymity. But in fact, the e-mail feature is the weakest part of the package. Questionnaires are sent out as plain-text files, and respondents must manually copy an authentication marker into their reply for the system to work. If any change is made to the authentication marker, or if a respondent doesn't enter all responses exactly as

required, the back-end utility chokes on the response. By contrast, SurveyWin's guided entry facility—soon to be ported to Java for crossplatform deployment—is a much better solution.

Decisive Survey lets you analyze e-mail and Web responses separately or together. The program generates frequency distributions, cross-tabulations, and a variety of chart types. The Team version we reviewed supports up to 100 responses, but Decisive Technology has packages that can handle up to 9,999 responses.

Decisive Technology plans to upgrade the program, but for now it's for only the simplest surveys.

DECISIONS, DECISIONS: Decision Survey uses a dual-plane window for form creation and includes several preformatted questions.

Decisive Survey 2.0. List price: \$799. Requires: 16MB RAM, 26MB hard disk space; Microsoft Windows 3.1, Windows 95, or Windows NT; Web browser that

supports HTML 2.0. Decisive Technology, Mountain View, CA; 800-987-9995, 415-528-4300; www.decisive.com. Circle 403 on reader service card.

MODEMS

Communications Central

U.S. Robotics' Courier I-Modem offers ISDN and analog connections over one phone line.—By Edward Mendelson

Until U.S. Robotics' Courier I-Modem with ISDN/V.34 arrived, you had to use two slots and two phone lines if you wanted your PC to communicate via both an internal ISDN adapter and an internal V.34 data/fax modem. The \$320 I-Modem is an internal device that combines an analog modem and an ISDN adapter on a single card, and includes support for Multilink PPP connections.

The I-Modem connects through a single telephone cable

and uses only one of your PC's precious IRQ settings. Other internal ISDN adapters require network drivers that add overhead to your system, but the I-Modem responds to AT commands like a traditional modem and needs no special drivers. It works transparently under Microsoft Windows, DOS, and OS/2.

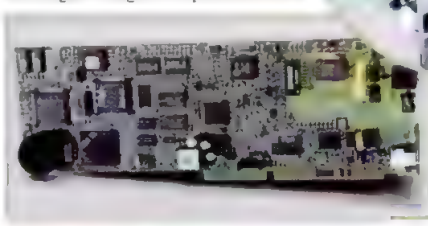
The card's on-screen configuration program prompts you to enter your ISDN line's details; expert users can enter AT commands in a terminal program. The modem is compatible with the Courier V. Everything series.

During testing, the modem portion per-

formed well and made connections reliably at 33.6 Kbps. Since the I-Modem tells Windows 95 that it's a standard modem, dial-up networking always reports a 64-Kbps connection, even when both B-channels are linked for 128-Kbps data transfer. The only clue the I-Modem gives when it combines the two B-channels is an undocumented beep, and there's no indication when the I-Modem drops to a single channel.

There's an analog output jack for an external telephone or fax machine, but it is usable only when your computer is on. The only other disadvantage to this communications center is that you can't handle two separate calls simultaneously as you can with a separate ISDN adapter and modem.

The Courier I-Modem is the ISDN card for modem users who want to add maximum ISDN speed with minimum ISDN fuss. **Courier I-Modem with ISDN/V.34.** Street price: \$320. Requires: ISA slot. U.S. Robotics Inc., Skokie, IL; 800-877-2677; fax, 847-933-5000; www.usr.com. Circle 404 on reader service card.



JACK-OF-ALL-TRADES: The I-Modem can connect via an analog modem or an ISDN adapter.



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FlowCharter did in this study, which focused on working with process flowcharts and multipaged diagrams. Users were more productive, more satisfied and preferred Micrografx FlowCharter over Visio by a wide margin."



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First Looks

MATH SOFTWARE

Mathematica Is a Natural

Mathematica 3.0 lets your PC answer your most pressing math questions.—By Barry Simon

Wolfram Research has done it again with its \$1,295 Mathematica 3.0 for Windows. Available on Microsoft Windows 95, Windows NT, Macintosh, and a host of Unix platforms, Mathematica goes a step further than other symbolic-math programs by letting you enter templates for powers, integrals, and other functions that look like the symbols you'd put on paper or blackboard. Entry is via floating symbol palette or keyboard shortcuts.

Although this approach is new for Mathematica—the symbolic-math powerhouse—Mathcad, Scientific WorkPlace, and Theorist have used this method for some time. But Mathematica surpasses these earlier attempts in several important ways. For one, output can be copied to the clipboard and pasted into other documents or programs. For another, you can toggle between plain English and natural symbolic format at any time, and Mathematica supports an extensive array of functions and techniques.

Mathematica's palettes are user-editable and -configurable. Buttons can be set up not only to enter special symbols, templates, and standard expressions but also to perform simple actions or run complete Mathematica programs. There are over 700 mathematical symbols included, and the program comes with Unicode for use with non-Latin alphabets.

Though this interface represents a huge advance over the state of the art, Mathematica's approach to making or customizing palettes is ungainly, and the sprawl of windows across the screen can be disconcerting. Mathematica's notebook interface approaches

a full-fledged publishing format—from its word processing features, which are now supported from style sheets, to color support that is better than that in Microsoft Word. Notebooks can be saved in HTML or TeX format, although HTML turns formulas into .GIF images, which can be awkward.

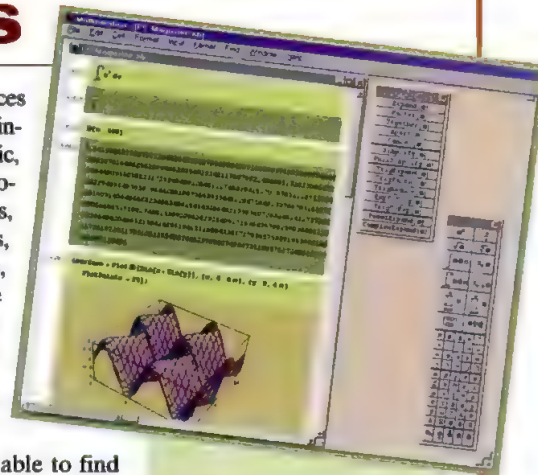
Evaluating indefinite integrals is as much an art as a science. A big advance in this version is that Mathematica can solve all 2,190 integrals in the Grashsteyn and Rhyzhik table; Version 2.2 could evaluate only 78 percent of them. In addition, Mathematica has implemented a number of algorithms for infinite integrals and sums, some of them only recently invented.

Other advances include support for interval arithmetic, numeric LU algorithms for matrices, Fresnel integrals, Mathieu functions, and systemwide support for algebraic numbers. But you're more likely to notice the program's increased speed.

Mathematica was able to find the eigen values of a 50-by-50 random matrix in less than a second; Waterloo Maple's Maple V took over 6 minutes to solve the same problem.

Mathematica remains weaker than its competitors when it comes to the simplification of complex expressions; it was unable to simplify the expression $\text{Sqrt}(5+2\text{Sqrt}(6))$, for example. Mathematica also seems to have ignored the strides made in recent years in object-oriented developer's tools.

Other than these small blem-



2 • 2 • ? Mathematica has floating symbol palettes, strong color support for text regions, and superb graphics.

ishes though, Mathematica 3.0 pulls ahead of the pack.

Mathematica 3.0 for Windows. List price: \$1,295 (with academic discount, \$895). Requires: 16MB RAM, 116MB hard disk space; Microsoft Windows 95, or Windows NT 3.51 or later. Wolfram Research Inc., Champaign, IL; 217-398-0700; fax, 217-398-0747. Circle 402 on reader service card.

UTILITIES

Rapid Data Transit

FastMove! focuses on quick and easy data transfer, with virus checking along the way.—By Bruce Brown

TouchStone Software Corp.'s \$50 FastMove! with ZipSync 2.0 provides a good alternative to overgrown file transfer programs like LapLink for Windows 7.5. FastMove! is an excellent data-moving alternative for those who transfer small files.

The program easily moves files on a single

PC. Its ZipSync feature ensures that your removable-disk backups are up-to-date, and the program can catalog your Zip disks.

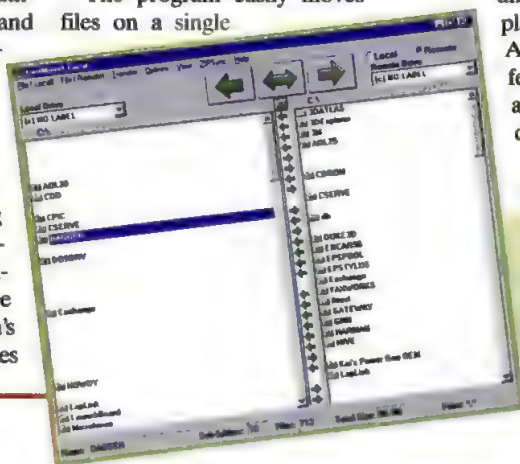
When two computers running FastMove! are connected via serial or parallel cable, or across a network, each system's drives and folders are displayed on the other. A single click transfers selected files and folders in one direction or in both.

There are user-selectable rules for

overwriting existing files, and virus detection is built-in. Based on TouchStone's virus scanner, PC-cillin 95, the virus-detection feature finds but can't clean up infections; for that, you need the \$50 PC-cillin 95 itself.

Despite its name, FastMove! isn't a speed demon when compared with LapLink 7.5. A 6.7MB file transfer took 4 minutes, 55 seconds with FastMove!; LapLink took 3 minutes, 16 seconds. A 95.8MB transfer that took LapLink about 30 minutes took FastMove! over an hour.

FastMove! is easy to use, helps manage removable backup media, and detects viruses. It's a bargain for those who move a lot of small files back and forth. **FastMove! with ZipSync 2.0.** Street price: \$50. Requires: 4MB RAM, 3MB hard disk space; DOS, Microsoft Windows 3.x, or Windows 95. TouchStone Software Corp., Huntington Beach, CA; 800-531-0450, 714-969-7746. Circle 401 on reader service card.



VISUAL AIDS: FastMove! shows clearly where files are going.

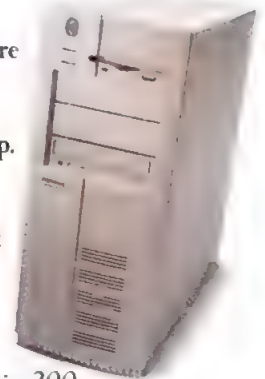


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First Looks

BOOKS

Real Business on the Net

These five books present proven ways to put the Internet to work for your business.—By Bruce Brown

When the realm of the Internet and the Web went from being a portal for scientific discussions to a digital marketplace, early dreams of making fast money by doing

business online led many to rush in with high hopes and equally high expectations. There was no lack of books and magazine articles that claimed to present the secrets

of striking it rich on the Web.

As experience has taught many newcomers to the Web, an online presence alone doesn't guarantee business success. According to the experts, it takes an original idea, hard work, and patience.

The five books we look at below are a help, though. They range from *Web Visions*, a compilation of interviews with a variety of business people to

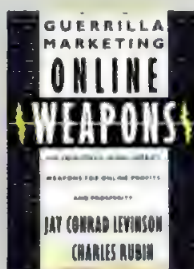
Kim Komando's comprehensive *CyberBuck\$: Making Money Online*, in which the author presents a comprehensive guide to online business brimming with helpful examples from her own successful online ventures.

With so many books available that tout the online bottom line, the only thing left for you to do is start making some money.

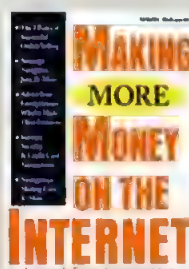
From Publicity to Profit



■ If you're willing to pay attention to the fine points, Kim Komando (a nationally syndicated radio talk-show host) walks you through the details of online business, from conception to money-making reality. In *CyberBuck\$: Making Money Online* (\$29.99) Komando covers the choice of a product or service to offer, Web design, marketing and sales, advertising and publicity, communications, and the relative advantages of going online directly and using an online service. There are also informative sections on legal issues, and an accompanying CD-ROM features the book's text in searchable format. Loaded with valuable information and presented in a conversational style, this book may be all you need to get your business going. www.komando.com/cyberbucks; ISBN: 1-56884-718-1.



■ Charles Rubin and Jay Conrad Levinson teamed up to write *Guerrilla Marketing: Online Weapons* (\$11.95), which presents an aggressive strategy for carrying out a successful online campaign. Divided into 14 chapters covering such topics as Web presence, good will, and gathering intelligence, this book is as much about online attitude as it is about specific business techniques. Because each of the 100 strategies detailed in the book is contained in a section no more than a few pages in length, the book is also a helpful check list to make sure you're not missing anything. If Levinson and Rubin are correct, online guerrillas can succeed in the interactive age by working hard, fast, and smart. www.hmco.com; ISBN: 0-395-77019-X.



■ An update to their *Making Money on the Internet*, Alfred and Emily Glossbrenner's *Making More Money on the Internet* (\$29.95; paperback, \$19.95) is a down-to-earth primer for those wanting to establish an online presence or start an online business. After laying out the reasons that online businesses fail and giving some examples, the Glossbrenners provide a comprehensive overview of the steps necessary to online success. Filled with examples of thriving Web sites, references to helpful services, and basic business wisdom, this book is a good introduction for those who don't need the more comprehensive material found in Komando's book. www.computing.mcgraw-hill.com; ISBN: 0-07-024300-X; paper, 0-07-024447-2.



■ Rather than cover every aspect of online business, *Publicity on the Internet* (\$24.95), by Steve O'Keefe, focuses exclusively on publicity. Because of its tight focus, this volume is terrific for three types of reader: those who want to use the Internet to get publicity; those who want to improve the effectiveness of attracting publicity; and those planning an interactive publicity campaign. The book shows that the Web is a great place to get publicity without spending a lot of money, though success requires special care and effort. Structured as a how-to guide, this book covers getting a site registered, using e-mail effectively, finding and adding links to your site, and setting up document-transfer functions. Of special interest is how to deal with online troublemakers. www.wiley.com/compbooks; ISBN: 0-471-16175-6.



■ Many large companies are making successful use of the Web without selling anything online. *Web Visions: An Inside Look at Successful Business Strategies on the Net* (\$29.95), by Dr. Eugene Marlow, presents case studies of how businesses have benefited from online activities. Readers learn the inside story on how Federal Express uses the Web to track shipments and measure performance, how General Electric encourages customers to get product information online, how HotWired brought advertising and editorial interests together without threatening either, and how IBM uses the Internet to distribute news and product information. The actions of specific companies—accompanied by generous quotations—show how these businesses got where they are. www.vnr.com; ISBN: 0-442-02453-3.

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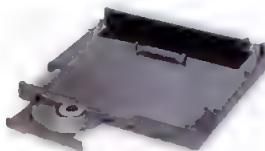
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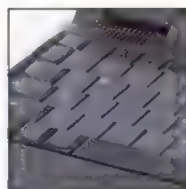
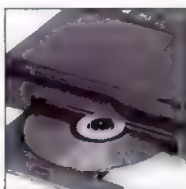
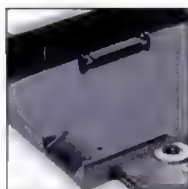
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Second Looks

LASER PRINTERS

The Little Printer That Could

When we initially reviewed the Lexmark Optra E, its pinpoint 600-dot-per-inch resolution and admirably small footprint were offset by its unhurried printing of our standard files ("Personal Printers Showdown," November 5, 1996). Rated at 6 pages per minute, this laser printer was at best about half as fast as the other printers in the same class, and it was beaten by many 4-ppm-class printers.

It's not that the Optra E's 5MB of memory, Minolta print engine, and 16-MHz AMD RISC processor weren't up to the job, but there was incompat-

ibility between the Optra E and the Microsoft Windows 95 print spooler that prints in the background. We originally evaluated

the Optra E with the spooler off.

The Optra E took over 8 minutes to create a com-

plex Freelance presentation that the other 6-ppm printers took less than 2 minutes to complete.

We went back to the lab and tried the whole thing again with updated copies of Windows 95 and Optra E firmware, turned on the Spooler, and saw dramatically improved results across

the board. The biggest gain was in printing the one-page Publisher file; the printer's time dropped from more than three minutes to just over one minute. But with the exception of the Word file, the Optra E still lagged behind the field, particularly the Editors' Choice-winning NEC SuperScript 660, which at times was roughly twice as fast as the Optra E.

You can download the updated firmware from www.lexmark.com.



Fooling with the Spooler

	Microsoft Word for Windows (5 pages)	Microsoft Excel for Windows (2 pages)	Microsoft Publisher for Windows (1 page)	Freelance Graphics for Windows (3 pages)
■ Without Windows 95 spooler ■ With Windows 95 spooler Minutes:seconds				
Lexmark Optra E	2:28 1:06	2:31 0:58	3:12 1:13	8:11 4:29
NEC SuperScript 660*	1:18	0:40	0:48	1:23
* Editors' Choice (11/5/96)	◀ BETTER	◀ BETTER	◀ BETTER	◀ BETTER

* Editors' Choice (11/5/96), reported for comparison

◀ BETTER

◀ BETTER

◀ BETTER

◀ BETTER

NOTEBOOKS

At Home, At Work

Although 1996 was not a red-letter year for Apple, 1997 has already yielded a happy surprise in the form of enhanced configuration software for PowerBooks.

Called Location Manager, the program lets you set up several profiles for your printer, network connections, and file sharing. But the most useful portion of the Location Manager may be its ability to have the system start up with different applications, depending on the profile.

The program will be welcomed by the hordes of PowerBook-toting nomads who want an individual setting for each work location. You could have

an office setting that includes a connection to the network and your LAN-based laser printer, and that starts up with your corporate e-mail system. Then when on the road, you could have a setting to match the infrastructure and time zone of each of your company's satellite offices. Finally, when you get home, you can use your PowerBook's profile for your home office's ink jet printer and have it start up with your Web browser open.

What Location Manager can't do is set up different power settings to get the best balance of power consumption and performance for different work settings. Apple says it's working on it.

So if you're frequently on the go with a Duo or any of a variety of other PowerBooks (140, 145, 150, 160, 1655, 170, 180, 540, 5300, and 1400 models), Location Manager can help you get down to business faster.

GROUPWARE

Secure Workplace?

Before the ink was even dry on our review of Lotus's Domino 4.5, Powered by Notes, a major bug turned up that rendered the groupware program vulnerable to persistent Web-aware hackers ("Notes Takes on the Net," March 4, 1997).

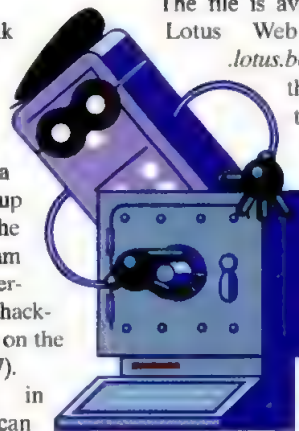
This breach in Notes' defense can allow a Web user to impersonate a legitimate Notes user, get into the system, and gain access to your entire corporate Notes database behind the scenes. This could render a cor-

poration's database of confidential information as readable as an open book.

If you've been using Domino 4.5, download and use the 4.5a release, which effectively plugs the system's potential security hole. The file is available from the

Lotus Web page (www.lotus.beta.notes.net).

If this is your first visit to the site, you may have to wait for as long as 2 hours for your password to become effective. But, it's worth the wait to make sure that no one is secretly poring over your data.



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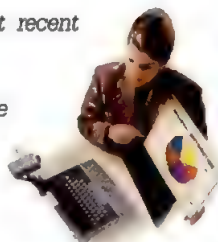
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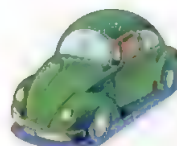
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Too Busy Having Fun

One of the best things about personal computers is how seamlessly we move from work to fun and back again. With all the graphical power and multimedia capabilities we have at our disposal, work can seem like fun, and fun can be surprisingly hard.

Habitual readers of this column will know that I've recently been working on a new Web site, Bill's Best of Everything (www.billsbest.com). I tried a lot of HTML editors before I came up with one I liked, and that one turned out to be a shareware program, HomeSite 2.0.

Working with HTML editors is like moving furniture. You can move furniture with some people but not others. Some people inspire confidence when they're on the other end of the sofa or breakfront, and others scare you half to death. A good editor works with you, not against you. It makes the things you want to do obvious on its menus, it has shortcut keys that are actually useful, it supports macros and customizable buttons, and most important, it works the way you expect it to work. HomeSite is all those things for me, and its \$39 fee is a flat-out bargain. Building a Web site can be hard work, but using good tools can make it such a pleasure that you hardly notice the hours. The only negative to HomeSite I can think of is that the .GIF viewing engine in the built-in browser isn't very good. HomeSite solves that by being able to encapsulate Microsoft Internet Explorer, so you can edit in one window while you view your work in a state-of-the-art browser in another.

On the fun side, my wife and I gave our son Microsoft Flight Simulator for Windows for Christmas, and I've taken a number of flights myself. I can confirm all you've heard about the excellence of this simulation, and one thing's for sure: Flying a virtual plane can be awfully demanding, especially for something that's supposed to be fun. Flying at night and in bad weather are challenging, to say the least. I found that telling myself, "It's only a game, it's just a simulation," was a waste of time. If a page of print can bring tears to your eyes, a screen full of instruments can feel like a cold spike in your gut!

One product that spans work, play, and kids' homework is Corel MEGA Gallery. I've never seen a larger collection of clip art, fonts, digitized photos, audio clips, and videos. It comes on five CD-ROMs (where are you, DVD?) and has all the clip art and fonts you get with CorelDRAW plus

much more. Missing, however, are the Web-specific borders, horizontal separators, and backgrounds you find in CorelWEB.Gallery. If you do any kind of presentations or desktop publishing, MEGA Gallery is all but indispensable. The only time I've come up empty-handed is when I

needed the triangular, three-arrow recycling symbol for my daughter's science project. MEGA Gallery had two versions of it, but neither looked like the familiar bottom-of-the-bottle symbol. Fortunately, we were able to get one from a Web-based commercial clip art company.

Other tangible evidence that fun can be hard work is UbiSoft's CD-ROM, Classic Rock Guitar. It's one of the best instructional video products I've seen, presenting eight enduring songs in 84 discrete lessons, complete with voice, video, a visual representation of the guitar fretboard, lyrics, chords, and sheet music. I'll admit I think the user interface is idiosyncratic (what does the 45-rpm record do? Or the guitar case?), but I'll put up with the oddities in order to get the excellent instruction, which breaks down each component of a song into a short video that you can loop. Looping is a great way to get a tricky technique down—and then you can play the entire song through. There's something for everyone, from a simple rendition of Bob Dylan's "Blowin' in the Wind" to a clean but rhythmically challenging version of "No Woman No Cry."

Heavier rock and blues techniques are covered in "Hey Joe" and "Life by the Drop," and you can even explore an alternate tuning in a pleasant arrangement of "Blackbird." Classic Rock Guitar doesn't have the depth of the Phil Woods Jazz Tutor CD-ROM, which can take a year or more to work through, but there's still anywhere from a couple of weeks to several months of work here, depending on your proficiency.

Whether it's great programming, thoughtful content creation, or sheer attention to detail, each of these products embodies something special. Which program most blurs the work/fun line for you? Drop me some mail at bill_machrone@zd.com. □



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Breaking Up the Internet Logjam

Right now there are logjams across the Internet that are little more than annoyances. They are caused by a number of factors, not the least of which is a bottleneck in Washington, DC. Of the four original Network Access Points (NAPs) assigned by

the National Science Foundation to phone companies—Pacific Bell (in northern California), Sprint (in New York and New Jersey), Ameritech (in Illinois) and Metropolitan Fibre Systems (in Washington, DC)—the MFS facility carries more than 60 percent of all worldwide traffic and an estimated 85 percent of all intra-European traffic. The joke is that that entire facility is essentially unstaffed and is located in a converted parking lot in Tyson's Corner, Virginia. Any traffic running through this hopeless NAP is choked by mediocre bandwidth.

Over the last year, numerous peer-to-peer agreements have been made by various ISPs and large sites to avoid some of the more obvious network bottlenecks. It wouldn't hurt if the bonehead government-operated telcos in Europe would loosen up so that the European community wouldn't have to send all its traffic to an American NAP to save money.

One group of institutions—large colleges and universities—is bypassing the whole Internet and developing Internet 2 (I2), which is a high-speed inter-Internet, if you will. If you examine the documents from these folks, you'll find it stated repeatedly that I2 will not be used to carry any commercial Internet or Web traffic. Then there's Genuity, Bechtel's own high-speed internet-work, an attempt to bypass various clogs. This is a company to keep an eye on.

The most interesting bottleneck, as far as I'm concerned, is essentially a fraud perpetrated on the public by phone companies and ISPs alike. This involves the re-selling of the same bandwidth over and over, with the theory that it's never going to be used.

For example, it's not unusual for an ISP to sell five or more customers T1 Internet access when the ISP itself has only one T1 link to another ISP. Of all the ISPs in the U.S., only about 20 are actually plugged into a NAP; the rest are plugged into other ISPs. The thinking is that if I have a dozen people hooked to T1 connections, the likelihood that any one of them is actually going to use all that bandwidth is close to nil.

Then there is the issue of routing. It's a joke how connections are made. You can see this for yourself using a little-known feature of Windows 95 called Trace Route. Open your browser and make a connection to the Net (this does not work with a non-PPP connection, such as AOL

provides). Go to the Start button and bring up Run. Type in COMMAND, then click OK. You'll get a small DOS window. It doesn't matter what subdirectory you are in. Type TRACERT (or PING) followed by any Web address. For example, C:\TRACERT www.zdnet.com will show you the routing and delay times from your link to the ZDNet site. Three numbers are displayed, each a separate packet sent to various routers. An asterisk means the data was lost en route. Each time a connection jumps from router to router, that's called a *hop*. You want to keep hops to a minimum. If you wonder why AOL is so clogged, try tracing a route to one of its Web servers. This would be TRACERT.members.aol.com.

What you will learn from the Trace Route exercise is that many connections are convoluted and slow, no matter what speed connection you have. In many cases the network falls apart and the site cannot be reached, even though it's up. Much also depends on the ISP and what you are paying for. Does anyone really think a cheap access price designed to attract millions of users is going to get you the best service?

Service quality varies enormously. The only way to test this is to put all service providers in a side-by-side test. Few users can do this. And worse, the service quality from the same provider can vary by region. The only way to deal with this is to ask around. Find out which providers other people use. Go to their machines and trace some routes. Look at the times. Well-performing ISPs have been drummed out of business by lowballers selling more bandwidth than is available and calling it unlimited access. This itself is a big part of the problem many people experience.

I'm convinced that the big-picture bottlenecks will be addressed by big thinkers and big projects like Genuity and I2. But we must do our part and demand quality service at our end.



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Inside Track

Perfect English Dept.: For some unknown reason, my recent comments (Inside Track, February 4, 1997) about the K6 chip were interpreted to mean the chip was slower than a Pentium Pro, when in fact it seems to run at least **30 percent faster** at the same clock speed. This difference annoys Intel to no end. The latest twist to the saga is that Intel, which had given AMD rights to the MMX technology, is now trying to trademark the MMX moniker, knowing that AMD and Cyrix want to use MMX on their labels too. **Here we go again.** While the cloners think they'll be using MMX on their brands, Intel has been more conservative regarding these issues and may prevail on this one, leaving AMD and Cyrix without any way to indicate MMX compatibility. They have to prove that MMX just means "multimedia extensions"—a public domain term—which may not be provable. Look for a ditty such as M2X, XMM, or simply Multimedia-X to crop up as a fallback. The **AMD K6/Multimedia-X** sounds pretty formidable to me.

In the meantime, look for some new developments from Intel to make the Pentium MMX a chip of choice for laptops over the next year. The **code name is Tillamook** (kind of cheesy, no?) and with a .25-micron semiconductor process, the chip will run at 1.8 volts, essentially cutting power requirements in half. Expect to see it later this year at 233 MHz.

Bigger and Bigger Dept.: The next big change in laptops has hit the streets: the new **13.3-inch LCD screens**, which pump 1,280-by-1,024 resolution. Every laptop maker will use them in some form or other.

This size, which is becoming **too big to be practical**, begs the question of how big a screen we are willing to put on a laptop. Seems to be a major marketing ploy—although I'm sure one of these units will get a lot of **attention** in an airplane. But I'm given the opportunity to use pretty much any laptop I choose, and I see no reason to change from the 4.1-pound IBM ThinkPad 560, with a 12.1-inch screen, for anything heavier just for a larger screen.

At the other extreme, Toshiba and everyone else, including Philips, are bringing out dinky Windows CE machines. Exactly what **secret report** was passed around the industry that said this was a good idea? In Japan they seem to be popular, and the new 1.5-pound Toshiba Libretto seems to be a hit there. It's a bit bigger than a palmtop and a lot more expensive.

The machine does have a few interesting kinks. The unit weighs 1.5 pounds with 8MB of RAM, a 520MB hard disk, and a **640-by-480 TFT screen**. Zounds! Shades of the Gateway Handbook! It might serve well as an emergency machine, always available in the brief-

*The next big change
in laptops has hit
the streets: the new
13.3-inch LCD
screens, which pump
1,280-by-1,024
resolution. Every laptop
maker will use them.*

case. A third computer, maybe.

Interesting Analysis Dept.: Guy Kewney, one of Britain's top technology writers, reports from London that the recent **jump in memory prices** might be traced to Germany, although the South Koreans are being blamed. Recently, the big three in Korea (Goldstar, Hyundai, and Samsung) cut their production of DRAM chips by 37 percent to drive up prices. In a published report, the South Korean government requested this "to save its economy, which has been decimated by a long period of low DRAM prices." I had no idea that the Korean economy was so dependent on DRAM. I also could not imagine these competitive companies

acting like OPEC. It sounded fishy. Then another **dubious news report** had it that the strikes in Korea were going to keep production down, too. According to Kewney, it's actually **Siemens** that persuaded the Koreans to cut production to **save** the new Siemens Dresden SIMM factory, which was losing serious money, no thanks to the low DRAM prices triggered by Hyundai's "scorched-earth policy" on DRAM. Siemens, through political wrangling, apparently managed to get the Korean government to "order" the country's three largest DRAM makers to cut production. Korean industry does a lot of trading with Germany. So much for free markets and honesty.

Another Step Closer Dept.: At least one company is showing off a two-way **satellite uplink/downlink** system that can give you Internet access from anywhere at up to 10 Mbps direct. The company is called SkyNet. No prices have been announced, but I suspect it's *not* \$19.95 a month for unlimited access. Whatever the cost, this is the kind of thing that will get the phone companies in gear. The one thing **telcos detest** is something called *bypass*. The term refers to attempts to go around, or bypass, the wires they own. I'm told there are half a dozen uplink/downlink systems being readied for the market over the next few years.

Genuinely Interesting Hardware Dept.: If you have a laptop and you are contemplating turning it into a desktop substitute, then you must buy this PC Card. It's the 1460A SlimSCSI from Adaptec, and it's one of the most **impressive** cards I've ever seen. I've been using one for six months, and I can't recommend it enough—mainly because it works. Numerous vendors over the last few years have shown me SCSI PC Cards, and none are as elegant or as reliable as this one. It plugs right into my SCSI chain of optical drives, turning my laptop into a powerhouse. **Highly recommended.** It costs less than \$200, and it's available at most stores. Go to the Adaptec Web site at www.adaptec.com for more information and free software updates. □

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Free Hard Disk Space! Fast Backups!

It's time to talk about disk partitioning again. Hey, don't turn the page—I know this doesn't sound very exciting, and it won't make you taller, thinner, richer, or hipper. But it *can* give you a big chunk of new hard disk space for free, and it can make using your

PC a lot easier, too.

I've written before about the importance of repartitioning your PC's hard disk into two or more smaller volumes. If you get the numbers right, you'll push the cluster size down and recover a surprising amount of space wasted by those huge clusters that DOS (oops, Windows 95) uses.

This is especially important in two cases: for hard disks over a gigabyte, and for PC users who save a lot of small files, such as e-mail messages. With today's notebooks routinely carrying hard disks of 1.3GB or more, and with so many of us turning into e-mail obsessives who store thousands of messages on our machines, this becomes a genuinely big deal—for which there is an incredibly easy and elegant answer.

The problem arises because DOS and Windows 95 use whole clusters to store data, and they can't dynamically resize clusters. If your file has a single byte more than will fit in one cluster, the operating system's FAT directory on your hard disk assigns an entire second cluster to that file. The result? Boom: You've instantly thrown away, maybe forever, almost all the space in that second cluster.

With big databases consuming thousands of clusters, this "cluster overhang" problem is largely irrelevant. Who cares about a few kilobytes of disk space lost in these tail-of-the-dog, nearly-empty clusters? But with zillions of smaller files—in other words, those found on PCs organized like yours and mine—it's a costly mess.

(For the record, Windows NT and OS/2 don't use fixed cluster sizes, and they don't benefit from disk repartitioning to save space. But NT and OS/2 users should keep reading, because there's another big reason for using multiple smaller-disk partitions.)

To a certain extent, hard disk housekeeping can reduce (though never eliminate) this problem. I try to sit down regularly to ferret out older e-mail messages I may not need to see again—ones that were sent to me as well the replies that I've sent—in the interest of holding down the number of files on my PC's hard disk. But that's almost

contrary to the spirit of e-mail, in which the old-messages archive you build can be an invaluable resource you turn to again and again. And frankly, it's terribly frustrating dog-work opening, rereading, closing, and possibly deleting all those moldy messages.

Regular cleanups are still a good idea (do as I say, not, I confess, as I do!), but moving to small partitions is the big win. For about two years, I've used PowerQuest Corp.'s Partition Magic to solve this problem, and I've come to rely on it utterly. I know this sounds like black magic—it *is* black magic—but Partition Magic lets you go in and resize *existing* partitions on disks that may already be full of fat, space-wasting clusters. In other words, it lets you recover from your slothful failure to repartition your hard disk down to realistic sizes (at least it lets *me* recover from my slothful misadventures).

Anyone who understands how hard disks are organized knows that repartitioning is a frightening procedure fraught with peril and unlikely to turn out right. The first dozen times I repartitioned a data-filled hard disk with Partition Magic (often getting a hundred megabytes or more of newly freed space), I was worried sick about trashing the disk. It just can't work, I told myself. Bad things are going to happen. Good-bye, data.

So far, I've never had even the slightest bobble with Partition Magic, now available in an improved upgrade to Ver-

sion 3.0. It's solid, incredibly useful, and (at about \$60 on the street) a screaming bargain.

If you're going to repartition, take a little advice.

First, make sure you keep a new partition's size just under the critical point that determine cluster size. I've come to rely on 511MB partitions (or "volumes") as the best compromise between usefully large disk sizes and usefully small cluster sizes. You may use another setting—Partition Magic's manual clearly explains your options and the consequences of each choice—but just make sure you don't set up, say, 256MB or 512MB partitions: You'll have crept over the line into wasteful habits again.



BUSY SIGNALS

The underlying problem is a fundamental change in the way we use the Web.

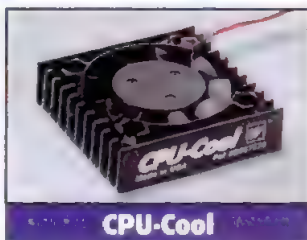
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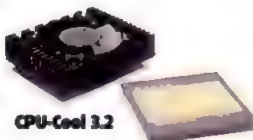


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JIM SEYMOUR

Second, consider the different ways of using that newly divided space. I find most PC users tend to build directories and subdirectories under their applications. For example, you might build directories such as BUDGET97, RECIPES, EXPACCTS, and so on under Microsoft Word for Windows. Then if you also use, say, Microsoft Excel and have some spreadsheet work to do on the 1997 budget, you might create another BUDGET97 subdirectory under the Excel directory.

A better option is to set aside one or more partitions of your PC's hard disk for the operating system, fonts, and applications, and another one just for your data. This separation of storage into apps and data not only avoids the insanity of wandering around your hard disk looking through huge partitions and directories for files in confusingly similar or even identically named subdirectories, but it also makes backup much easier and faster. If you intermingle apps and data in your directories, you need to back up the whole hard disk every time, which is slow, frustrating, and wasteful. But you don't really need those *apps* backed up, do you? You still have the CD-ROMs they came on, right? If you had to do a big restore after a disk crash, or if you even had to install a whole new hard disk and rebuild it, you could easily reinstall that software from your CDs. It isn't the apps that are unique and valuable, it's your *data*. So why not keep apps and data in separate partitions, allowing for much faster backups of the *disk partition with the data files*?

In many cases, you can even use inexpensive 100MB ZIP or 230MB SyQuest EZ-Flyer drives and disks for these ad hoc datafiles-only backups. And you can just click and drag the partition—or only selected directories on that partition—over to the ZIP drive.

I know: For old-timers, this is old news. But every time I talk about the value of smaller partitions, recovered disk space, and the logic and convenience of keeping applications in one place and data in another, I get a huge response from people to whom this wasn't just news, but big news.

So you graybeards out there can sit back and smile smugly, knowing that *you* carefully repartitioned the hard disks in *your* PCs the day you bought them, long before you put any data on them.

Just like the way you make backups every night, eh? □



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Noteworthy Notebook Trends

Remember the IBM ThinkPad 701C Butterfly notebook, with the incredible unfolding keyboard that allowed standard-size keys in a unit with an 8- by 10-inch footprint? The Butterfly died a year and a half ago, when notebook displays moved beyond 10.4 inches. Now, displays dwarf keyboards as screen sizes exceed 13 inches. And that's not all that's changed. Here's my take on the portable computer market for the second half of the year.

Expect more from a notebook. And as a result of portables' greater capabilities, more of us will be using them as primary PCs. Another trend is the modular bay that takes a floppy disk drive, a CD-ROM drive, and, ideally, a second battery. We're also seeing less emphasis on high-end systems, as more buyers find that value notebooks have virtually all the features users need.

These days, the display should be 12 inches and feature Super VGA (800-by-600) resolution. Dual-scan color is good enough for many users. For XGA (1,024-by-768) resolution, a year ago I said that a 12.1-inch display was sufficient. Not so: You want at least a 13.3-inch display—ideally, 13.8 inches or greater. In addition, although power-user road warriors have traditionally wanted the best and latest, those of us who really wring out our machines will be willing to forgo cutting-edge CPUs and displays to get more battery life. But a big—really big—hard disk is vital.

Notebooks now have hard disk capacities ranging from 1GB to 2GB; 3GB will be an option at midyear and 4GB at year's end. Imagine: 4GB in something the size of an audiocassette!

As for CPUs, we're still the better part of a year away from Pentium Pro portables. In the meantime, the mobile version of the Pentium MMX processor looks attractive, especially at 200 MHz. Even if you don't take advantage of the MMX instructions, the bigger internal cache—32K versus 16K—gives you a 10 percent speed gain.

It should be easier to find built-in modems, although many vendors are fighting a rearguard action, saying that they don't always work abroad. Translation: Modems work just fine in most places, but you annoy the host country's postal, telephone, and telegraph bureaucracies.

Also, learn to like touch pads. Vendors have found

that pointing-stick fans grudgingly accept touch pads, but that touch pad zealots moan long and hard about pointing sticks.

Look for big changes in the subnotebooks carried by road warriors. For example, more of us need a self-contained CD-

ROM drive on the road, a feature that pushes a notebook's minimum weight from 4 pounds to 5 pounds and the minimum height from 1 inch to 1.5 inches (still not an onerous burden to carry).

For high-end (\$4,000-plus) notebooks, the question of whether technology will produce larger screens than users want should be answered by year's end. I believe there will be a solid market for 15-inch panels: They provide roughly the same viewable size as 17-inch CRTs, and that is the point where a 1,024-by-768 display really feels comfortable. Notebooks with 15-inch panels will be the preferred units for mobile presenters, and they'll also be great desktop replacements. Users who travel frequently will probably stop at about 13 inches.

Some other points to consider:

You don't need to wait for Windows NT 5.0. Vendors are successfully installing Version 4.0 on notebooks, especially those vendors that can devote the resources to force-fitting Windows NT where it wasn't designed to go.

The 430TX (Mobile Triton II) chip set, due around midyear for the Pentium with MMX, will boost performance and reduce power drain.

Nickel hydride batteries will match lithium ion for power per cubic inch of notebook volume. But lithium will still produce a lot more power per ounce.

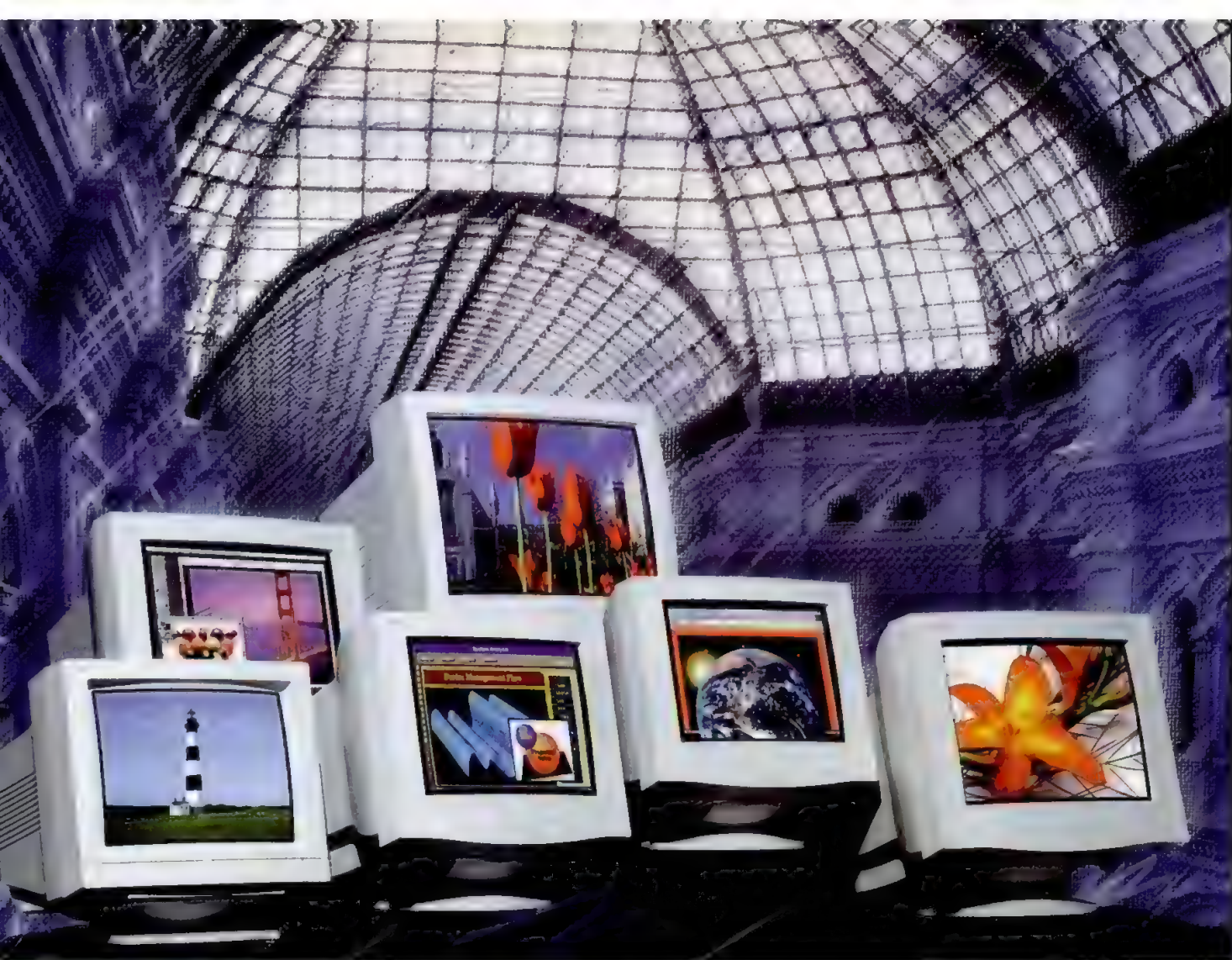
Universal Serial Bus connectors that work well will arrive this year. But USB won't supplant parallel or serial ports anytime soon.

Vendors will reduce videoconferencing circuitry to fit on a PC Card, then build it into many systems. Just add a tiny camera. When you're traveling, you'll take part in your workgroup conferences, and later you'll call home and say good-night to the kids. Never underestimate the attraction of a technology that has a strong personal hook. □



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AcerView 76ie	17" (15.7 Viewable Image Size)	1280x1024 @65Hz	iScreen® On-Screen	.27mm
AcerView 56e	15" (13.7 Viewable Image Size)	1280x1024 @62Hz	Digital Control	.28mm
AcerView 54e	15" (13.7 Viewable Image Size)	1024x768 @66Hz	Digital Control	.28mm
AcerView 34T	14" (13.1 Viewable Image Size)	1024x768 @60Hz	Analog Control	.28mm

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NETWORK EDITION

INTERNET E-MAIL ANTIVIRUS GATEWAYS

First Line of Defense

Antivirus gateways can help you stop the spread of Internet-borne viruses before viruses stop your network.



By Sarah L. Roberts

Who can imagine getting through the work day without Internet e-mail messages and the file attachments they bring? Unfortunately, part of what they bring can include viruses. Over the past two years, e-mail attachments have become potential carriers of the dreaded new macro virus. The more you leverage networking and interconnections as a corporate advantage, the more you open your systems up to intrusion and viral infection. Traditionally, we fought viruses with desktop and server antivirus products, such as 'Dr. Solomon's Anti-Virus Toolkit and McAfee Associates' VirusScan (see "The 1997 Utility

ILLUSTRATION BY MICHAEL KLEIN

INSIDE



For two days last year the supposedly harmless Word .concept virus threw PC Magazine's editorial network into a frightening state of disarray.

Macro viruses are a new menace to networks, because they come hidden inside e-mail attachments that can be spread far and wide in a matter of minutes. You can of course go after these monsters one at a time with traditional desktop and server antivirus packages. But now there's a new way to nail them before they nail you.

INTERNET E-MAIL ANTIVIRUS gateways are the subject of this Network Edition Cover Story. These packages work with your mail server to identify and deal with viruses embedded in e-mail attachments before they spread across your network. Technical analyst Russ Iwanchuk fired up three of these antivirus solutions and threw every virus he could think of at them. He also took a look at performance, installation, configuration, and management.

THERE'S A NEW ISDN ROUTER on the market just about every time you turn around. Contributing editor Les Freed tested an entry from Cisco Systems that stands out from the pack by using Cisco's famous Internetwork Operating System (IOS). But this time Cisco packages IOS with a slick new interface for users who are less network-savvy. (Page NE19.)

AUTOMATED NETWORK management and daily HTML-based reports are offered by a new product from Kaspia Systems, reviewed by contributing editor Steve Rigney in First Looks. (Page NE19.)

NIC REDUNDANCY PRODUCTS are the subject that Steve Buehler, director of PC Labs, West Coast, tackles in Multiple Access. (Page NE20.)

—Leon Erlanger

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Memory expandable to 1GB
(8 DIMM slots)
8 open expansion slots: 5 PCI, 2 ISA,
1 shared ISA/PCI
Integrated Adaptec® PCI
Ultra Wide SCSI-3 controller
Integrated Intel EtherExpress™
Pro 100 controller
Integrated SVGA graphics
12X SCSI-2 CD-ROM drive
3.5" floppy drive

9 drive bays: 6 internal 3.5",
3 external 5.25"
15" Micron 15FGx, 28dp (13.7" display)
Microsoft® Mouse, 104-key keyboard
Microsoft Windows NT Server 4.0
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Intel® LANDesk Server Manager 2.52
Integrated hardware instrumentation
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5-year/3-year Micron Power™ warranty
1-year next-business-day on-site service*
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resolutions), 7x24

*On-site service for the Vortex Lx Server is provided by Digital Equipment Corporation and is optional.

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4GB Ultra Wide SCSI-3 hard drive

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Bus. lease \$173/mo.

VETIX 2Lx

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Pentium Pro processors
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Dual 2GB Ultra Wide SCSI-3 hard drives (4GB total)

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Pro compatible) wavetable sound
Tool-free minitower or desktop
Microsoft Mouse, 104-key keyboard
Microsoft Windows® 95
Intel LANDesk Client Manager
5-year/3-year Micron Power warranty

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Guide: Antivirus Utilities" in this issue). Macro viruses, in combination with increased Internet access, however, have changed the landscape. Since they come directly to the desktop hidden within e-mail attachments—primarily as Microsoft Word and Excel documents—macro viruses often elude standard virus detection.

A macro virus is invisible to traditional virus scanners until the user launches the infected file attachment. And an infected attachment forwarded to numerous other users can turn the network into a virtual hot zone.

Fortunately, you can combat the macro virus threat. A new crop of Internet e-mail antivirus gateway products can sit inside your firewall and work with your SMTP server to detect viruses as they enter the network. Some firewall vendors, such as CheckPoint Software Technologies, are working to incorporate this technology into firewall products. Integralis announced late in 1996 that its MIMESweeper is compatible with—and can even share a single server with—CheckPoint Firewall-1. And Norman Data Defense Systems' Norman Firewall, which will be available for Microsoft Windows NT Server sometime in mid 1997, already has built-in virus-scanning capabilities.

LET THE SCANNING BEGIN

For this roundup, we tested InterScan E-Mail Virus Wall, from Trend Micro Devices, MIMESweeper, from Integralis, and WebShield, from McAfee Associates. We also looked at Symantec's Norton Antivirus for Internet E-Mail Gateways, which should be available by the time you read this.

Although all these products can detect program, boot, multipartite, and polymor-

Editors' Choice

• InterScan E-Mail Virus Wall, Version 1.72



Protecting networks from viral infections is a formidable undertaking. All the Internet e-mail antivirus gateways we looked at handle

the task with aplomb, but InterScan E-Mail Virus Wall, Version 1.72, from Trend Micro Devices, did it best.

Virus Wall was the easiest to setup and configure with its intuitive interface and one-screen access to scanning rules. With Virus Wall's Web-based configuration program, you can change parameters for virus scans and look at specific portions of the ample activity logs. In addition, Virus Wall lets you easily

quarantine and clean infected files.

Of the products in our roundup, Virus Wall is the only one that offers automated virus updates. MIMESweeper and WebShield notify you of updated lists, but you have to download the lists manually. Virus Wall is also the least expensive product here: \$1,435 for a 100-user license. And as an added cost-saving measure, it can sit on your SMTP server, which is useful if you have a comparatively small network.

phic viruses—as well as macro viruses—none claims to be a total solution to the virus problem. Instead, they are meant to supplement your existing antivirus solutions, providing yet another layer of protection.

Each of these products was able to scan and disinfect files at the gateway. But the disinfection feature is tough to find in MIMESweeper and WebShield. With MIMESweeper, the capabilities of the your third-party virus-scanning engine determine whether you can clean files. WebShield's disinfection ability is undocumented, but you can access the scanning engine from the command line. InterScan E-Mail Virus Wall is the only product we

tested that leads you directly to the disinfection function.

If you trust your users to disinfect files on their own, you can set up these packages to forward infected files to the recipients, alerting them and the network administrator that an infected file is on its way.

WHAT WE FOUND

If you want to provide a first line of defense against viruses and have options for dealing with infected files, these products are worth a look. Each is priced at less than \$2,000 for a 50-user license. MIMESweeper is slightly different from InterScan E-Mail Virus Wall and WebShield in that it also lets you

A Threat of Macro-scope Proportions

By Robert Daly

Over the past two years, a new type of computer virus—the macro virus—has displaced the boot sector variety as the most common virus headache. Macro viruses embed themselves in Lotus AmiPro and Microsoft Word and Excel documents and are devilishly hard to detect. They often arrive in the form of e-mail attachments and evade traditional virus-scanning systems.

Unlike the more established boot sector viruses, which are still a serious threat, macro viruses aren't written for a specific operating platform, don't require a system boot to spread, and are application-specific. One infected Word file can infect systems running Microsoft Windows 3.x, Windows 95, Windows NT, and Macintosh. And all it takes to infect your system is opening the infected file. The virus code resides in the file's macro commands, which automatically execute on opening.

The most common Word macro virus is Word.concept, which spreads by adding a macro to the global template, NORMAL.DOT. The macro changes any file saved using Save As into a template file that includes the virus code. "Harmless virus" is an oxymoron, but of all the macro viruses, Word.concept is the least malicious; it leaves the data in files and on the desktop intact. The macro viruses MDMA, NPAD, and Wazzu are not as kind. MDMA invokes the DOS shell, and on a Windows 95 platform it attacks the system's root directory and deletes files.

The best way to deal with a macro virus is to avoid infection or—at least—to prevent its getting to the desktop. A disinfectant and a good e-mail gateway scanner, such as the ones we review in this roundup, will catch common macro viruses before they penetrate your network. If the virus does get through, most desktop antivirus products work, but plan on spending some time disinfecting affected clients.

Oracle7 on NT

Features	Oracle7	Microsoft SQL Server
Runs from Laptop to Data Center	YES	NO
WebServer/Database Integration	YES	NO
Cluster Support (Fault Tolerant Parallel Server)	YES	NO
Multiprocessor Scalability	From 1 to 400+ processors	From 1 to 8 processors
Parallel Query, Load, Index	YES	NO
Star Queries	YES	NO
Bitmap Indexes	YES	NO
Integrated Replication	YES	NO
Row-level Locking	YES	NO
OLAP/Multidimensional Integration	YES	NO
Video Storage and Playback	YES	NO
Text Storage and Search	YES	NO
Spatial Data	YES	NO

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set rules for the handling of inbound and outbound e-mail based on content. In this way, you can both keep junk mail out and protect sensitive internal documents.

We tested all of the products on a Dell Dimension XPS P/166. Except for WebShield, which is Linux-based, all the products ran on Windows NT Server 4.0. Once we configured the software and established the rules for dealing with infected files, administration was minimal.

All the products except WebShield were able to scan files without causing noticeable delays in e-mail delivery. WebShield forces all Internet traffic through its gateway, which could be responsible for the slower throughput. We also detected a bug in the WebShield software that may have been the sole cause of the slowdown. McAfee says that the bug will be fixed by the time you read this story.

For this roundup, we concentrated on SMTP scanning. Currently, WebShield is the only product that can also scan FTP and HTTP files. Integralis and Trend Micro Devices plan to include this functionality in future versions of their Windows NT-based products. The Solaris version of InterScan E-Mail Virus Wall can already do this.

To evaluate these products, we looked at ease of installation and configuration. MIMESweeper's text-based configuration was the most difficult. In contrast, InterScan E-Mail Virus Wall featured an intuitive GUI that made configuration a snap. It shows all rules on one screen, so you can quickly grasp the entire rule set.

We also tested and rated the management and maintenance tools that come bundled with the products. Again, InterScan E-Mail Virus Wall came out ahead; it lets you configure it to check InterScan's Web site periodically and download virus updates automatically. MIMESweeper and WebShield also offer virus updates, but you have to download and add them manually.

We examined virus-detection capabilities, including breadth of virus coverage and the ability to handle complex attachments. All the products handled the viruses we threw at them equally well. And each one handled complex attachments, including viruses contained both in a single ZIP file and in ones we ZIPped multiple times.

If your Internet e-mail traffic has increased significantly and you're concerned about viruses hidden in attachments, you may want to consider investing in one of these antivirus gateways. Though the technology one day may be built into your firewall, you still need to protect your network from viruses before they get to the desktop.

Trend Micro Devices Inc.

InterScan E-Mail Virus Wall



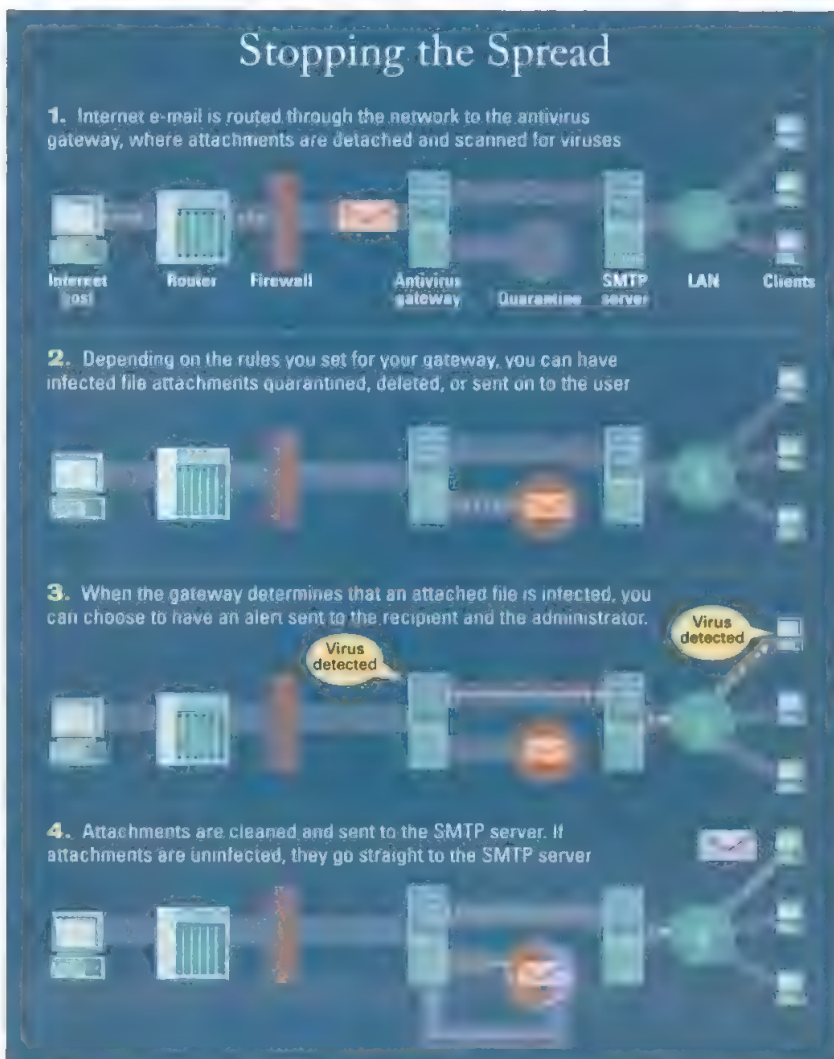
ALL REVIEWS BY RUSSELL IWANCHUK

If you don't want to mess around with WebShield's Unix platform and you don't need the e-mail content control of MIMESweeper, InterScan E-Mail Virus Wall, Version 1.72, from Trend Micro Devices, is a solid choice for an antivirus gateway. It features ample virus-scanning options, an easy-to-use Microsoft Windows- and Web-based management system, and extensive activity logs. Like MIMESweeper, Virus Wall sits on the same segment of the network as your SMTP server and scans SMTP traffic. According to Trend Micro Devices, the next version

will scan FTP and HTTP traffic as well.

Like MIMESweeper, Virus Wall runs as a Windows NT service. It doesn't require a dedicated machine, although we tested it on one. If you can reassign the server's port number, Virus Wall can sit on your SMTP server, which is handy for smaller networks where running multiple processes on a single machine doesn't cause much of a processor bottleneck.

When looking for viruses, Virus Wall detaches attachments from incoming e-mail and sends them to a gateway where they are scanned. You can configure the product so that an infected file is passed through to the recipient, deleted, or quarantined. The product can also send customized warning messages to the sender, receiver, and mail administrator. If you choose the quarantining option, files can be forwarded to the sender or recipient, or saved to a local directory where they are cleaned by the administrator.





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get a grip

Virus Wall also scans outbound mail. Savvy users, however, can bypass the virus-scanning process by sending outbound e-mail directly through the router to the Internet—an impossibility with a firewall approach to scanning like WebShield's.

Thanks to Virus Wall's intuitive Windows installation procedure and ample documentation, we were able to set it up in about 15 minutes, including the time it took to define rules. For ongoing administration



Bases Covered: Virus Wall's configuration window covers all the bases.

tasks, Virus Wall was the strongest of these three products. You can change parameters for virus scans and peruse the characteristics of the viruses being hunted. Or you can look at specific parts of log files using the V configuration program. The product also provides automatic virus updates.

InterScan E-Mail Virus Wall, Version 1.72. List price: For 100 users, \$1,435. Trend Micro Devices Inc., Cupertino, CA; 800-228-5651, 408-257-1500; fax, 408-257-2003; www.antivirus.com. Circle 951 on the reader service card.

Integralis Inc.

MIMESweeper

In addition to performing virus-scanning duties, Integralis's MIMESweeper, Version 2.4_3 helps control the content of your network's Internet e-mail traffic. By letting you search within the body of an e-mail for phrases and certain files types, MIMESweeper lets you prevent the dissemination of confidential documents via the Internet and keep junk e-mail out of your network. Though it lacks some amenities, such as Virus Wall's easy configuration, MIMESweeper is an effective antivirus gateway.

MIMESweeper runs on Microsoft Windows NT 4.0 as a service. It scans inbound and outbound e-mail messages and their attachments with validators, which are modules you can configure to search

SUMMARY OF FEATURES

Internet E-Mail Antivirus Gateways

PC MAGAZINE
NETWORK EDITION
EDITOR'S CHOICE

■ YES ■ NO

Products listed in alphabetical order

List price for 100-user license

Suggested System Configuration

Processor

RAM

Hard disk space

Scans and Notifications

Scans inbound and outbound FTP/HTTP/SMTP traffic

Scans recursive binhex/MIME attachments within a file

Scans recursive uuencode/ZIP attachments within a file

Blocks Java binaries

Alerts via e-mail/pager/network broadcast

Administrator can define address to which alerts are sent

Notifies sender/recipient of infected file

Can disinfect/quarantine infected files from primary interface

Can delete/ignore infected files

Installation and Management

HTML-based management

Can be managed from a trusted address

Does not require alterations in DNS record

Does not require alteration in client mail readers for outbound scanning

Downloads virus updates from the Internet

Automated weekly/monthly virus updates

e-mail text, examine attachment type and size, or quarantine inbound and outbound e-mail based on sender, recipient, or domain. When MIMESweeper detects an infected attachment, it sends e-mail alerts to the sender, recipient, and administrator, or deletes or quarantines the infected file.

Unlike the other solutions here, MIMESweeper does not include its own virus-scanning software. You have to point MIMESweeper at a preinstalled scanning package (which is not included); MIMESweeper supports several, including products from McAfee. Though this is inconvenient for those who want a turnkey solution, MIMESweeper will most likely support the virus-scanning engine you already own—which is not the case with Virus Wall or WebShield. And MIMESweeper allows you to scan with multiple scanning engines.

MIMESweeper was more complicated to install and configure than both Virus Wall and WebShield. The product comes with a GUI but stores its settings in seven text files. After a little fiddling, we got the product up and running. And though the documentation is thorough, a more extensive Windows GUI would facilitate configuration. As for processing power, Integralis recommends

InterScan
E-Mail Virus
Wall 1.72

MIMESweeper
2.4

WebShield 1.0

\$1,435

\$2,500

\$1,695

Pentium/133

486/100

Pentium/166

32MB

32MB

32MB

512MB

1GB

2.5GB (total, on 2 hard disks)

Scans inbound and outbound FTP/HTTP/SMTP traffic

Scans recursive binhex/MIME attachments within a file

Scans recursive uuencode/ZIP attachments within a file

Blocks Java binaries

Alerts via e-mail/pager/network broadcast

Administrator can define address to which alerts are sent

Notifies sender/recipient of infected file

Can disinfect/quarantine infected files from primary interface

Can delete/ignore infected files

HTML-based management

Can be managed from a trusted address

Does not require alterations in DNS record

Does not require alteration in client mail readers for outbound scanning

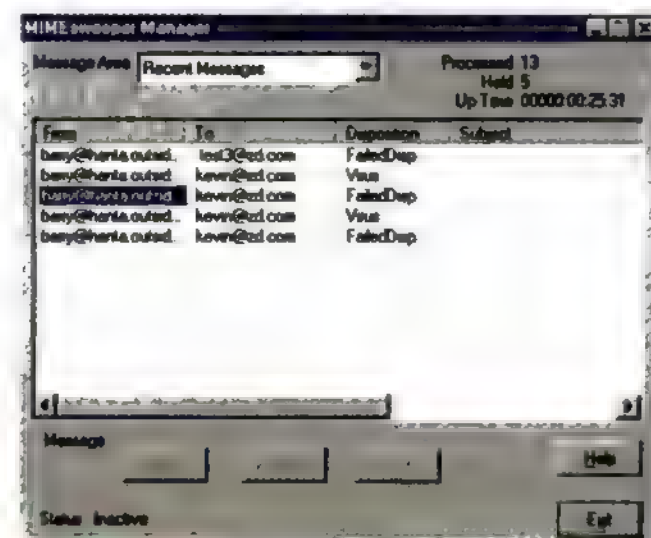
Downloads virus updates from the Internet

Automated weekly/monthly virus updates

Installing MIMESweeper on a 100-MHz 486 machine with 32MB of memory. Like Virus Wall, however, MIMESweeper can sit on the same machine as your SMTP server.

Despite its weak GUI and difficult installation, MIMESweeper does a good job of removing infected files from your e-mail. And the bonus of content control makes it an attractive solution for administrators looking to regulate what is broadcast to the world of the Internet via e-mail.

MIMESweeper, Version 2.4_3. List price: For 100 users, \$2,500. Integralis Inc., Kirkland, WA; 800-982-6109, 206-889-4724; fax, 206-



Managing Mail: In the manager window, you can see information about e-mail messages.

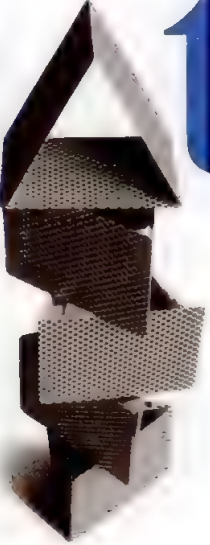
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As seen in The Wall Street Journal



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The Wall Street Journal, August 16, 1996

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Symantec's Gateway Scanning Option

Long a player in the antivirus arena, Symantec (800-441-7234; www.symantec.com) has also decided to enter the antivirus gateway field with its upcoming product, Norton AntiVirus for Internet E-Mail Gateways, or NAV-IEG. This product didn't ship in time to be included in our roundup. We did, however, have an opportunity to look at a late beta version. The late beta NAV-IEG was still buggy, as is often the case with beta code, but all in all it promised to be competitive with the other products we reviewed. NAV-IEG should be available by the time you read this, and at press time Symantec was planning to price the product according to the number of users per SMTP server: \$1,499 for from 1 to 500 users.

Just like the products in our roundup, NAV-IEG is a software-only solution. And like MIMesweeper and Virus Wall, NAV-IEG runs as a Microsoft Windows NT service on the machine that acts as your antivirus gateway; it sits as a peer on the same network as your SMTP server. Symantec suggests using a Pentium/133 PC with 32MB of memory for your gateway, but for faster WAN connections, using

a more souped-up machine is wise.

Symantec has obviously invested a significant amount of time developing the HTML-based GUI for NAV-IEG. Though both Virus Wall and WebShield had HTML-based user interfaces with good functionality, neither one was particularly snazzy. With Java-enhanced pages, animated GIFs, and pull-down menus, NAV-IEG's interface really stands out. And it's easy to work with. This is the only interface to NAV-IEG, unless you want to edit configuration files manually, and it offers encrypted-password security for over-the-network management.

The rules you choose for scanning SMTP traffic are highly customizable; NAV-IEG is the only product that lets you set different rules for inbound and outbound traffic for each of the protocols scanned. You can also customize the extent to which scan and system events are logged. The NAV-IEG interface has a decent log viewer that can filter log files by alert type and date, but it isn't as complete as the one in Virus Wall. With its wealth of scanning options, NAV-IEG is a product to look out for when considering a gateway purchase.—*RI*

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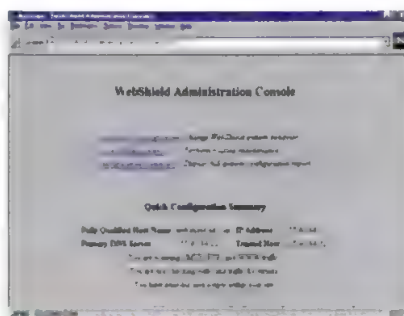
889-5841; www.integralis.com. Circle 952 on the reader service card.

McAfee Associates Inc.

WebShield

Though McAfee Associates' WebShield 1.0 protects your network from viruses borne via Internet e-mail attachments, using it may exact a price in terms of performance. Also, you need a solid Unix foundation to set up this solution, which is not the case with MIMESweeper and Virus Wall. But WebShield provides extra security by forcing all potential virus-carrying Internet protocols through the gateway.

WebShield is also the only product in our roundup that requires a dedicated server. We recommend a 166-MHz Pentium PC with 32MB of RAM, a SCSI adapter with two SCSI drives, an attached CD-ROM drive, and two NICs. McAfee says the product can run on a 25-MHz 486 processor, but you get better results with a more powerful machine. Unlike the other products, Web-



HTML Beginnings: The entrance to WebShield's configuration is the administration console.

Shield sits between the Internet and your network. From there, it scans all inbound and outbound Internet traffic, even types incapable of carrying viruses, such as ping.

Like MIMESweeper and Virus Wall, when WebShield detects an infected file it can delete, quarantine, or allow the infected file to pass through, depending on the rules you set. It then issues a customizable message to the sender, recipient, and ad-

ministrator. WebShield can clean infected files, but the process is difficult and McAfee does not promote this capability.

A major problem with the product is a 40-second delay between the time the host contacts WebShield and the time the e-mail message is delivered to WebShield. But end users probably won't notice a delay from this potential bottleneck, and McAfee says the problem will be fixed in the next release.

If you have the right hardware and some Unix expertise, WebShield's installation is straightforward. Configuration is easy, and—as with MIMESweeper and Virus Wall—WebShield can be adjusted via a Web browser or from a console running on WebShield itself. The console GUI is utilitarian, but it allows the user to launch several command prompts by hitting Alt-<function key> combinations. □

Webshield 1.0. List price: For 100 users, \$1,695. McAfee Associates Inc., San Jose, CA; 800-866-6585, 408-988-3832; fax, 408-970-9727; www.mcafee.com. Circle 953 on the reader service card.



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*10-minute installation assumes running Windows 95 and using Eicon's ISDN line ordering service. The ISDN line must be installed and functional at installation.
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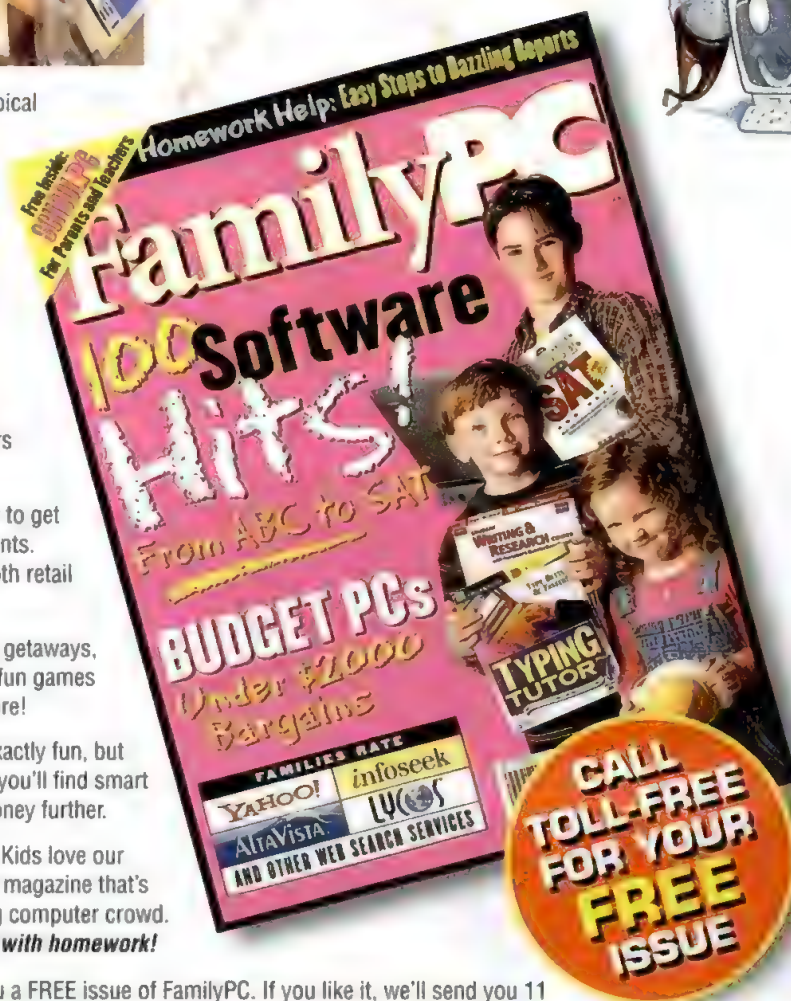
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First Looks

HANDS-ON REVIEWS OF NEW SHIPPING PRODUCTS

NETWORK-MONITORING SYSTEMS

The Network Smoke Detector

By Steve Rigney

Several SNMP management consoles on the market let you centrally monitor routers, hubs, and such other manageable devices as RMON probes on your enterprise network. But Kaspia Automated Network Monitoring System, Version 1.1, from Kaspia Systems, takes this process one step further by automating it. This Microsoft Windows NT-based product identifies all devices that contain SNMP MIB (Message Information Base) data, automatically polls them on a regular basis, and generates a daily Web-based report.

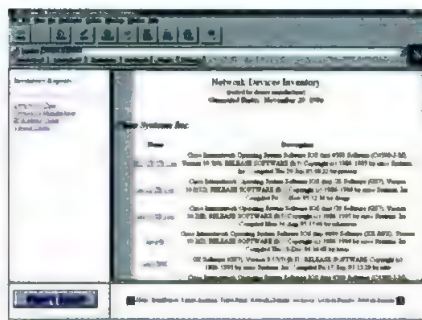
Though Kaspia's interface and online help aren't as intuitive as those in HP OpenView or other SNMP management utilities, its automatic monitoring and reporting capabilities are more powerful. We found that the product takes a few days to learn, but if you regularly monitor the reports, you can save valuable time down the road.

Kaspia is sold in two parts: the console and the polling units. The \$5,000 console software includes the Discovery and Data Collection, Monitoring, and Report Center modules. The polling units are sold separately for \$100 each and are basically node licenses. You have to purchase a polling unit for each device on your network that you want to monitor, but a single console can monitor thousands of polling units. The entire package requires at least a Pentium/133 with 32MB of RAM, a 1.6GB

hard disk, a high resolution display, and a CD-ROM drive.

Kaspia is fairly easy to install as long as you know the IP address of the main—or seed—router and any SNMP string variables.

The first of the modules, Dis-



Keeping Track: The Network Device Inventory Reports let you sort devices by manufacturer.

covery and Data Collection, looks for and periodically polls devices that contain MIB-based data and then builds a topology of your network. It can determine how many network segments you have and even the type and revision codes of the devices. It also checks all devices for network performance statistics.

The inventory portion of the Discovery and Data Collection module can find all of your network IP addresses and provide the version number of your NetWare and Windows NT servers. Future versions will offer more information on individual client PCs.

From the Monitoring Console, you can view your network topology and the information on each device. To see such information as router model number and amount of router traffic, you

click on a representational icon; the amount of information provided depends on the stored data in the MIB. Some MIBs can store only basic information—the name of a device and whether or not it is functional. Other devices contain MIBs that

provide traffic statistics and other real-time information. After the Monitoring Console gathers all the information, you can create a series of reports through the Report Center.

The monitoring system generates several different reports, including a daily SmartReport, failure analysis, network change report, and several device-specific reports. All of the reports are created as HTML documents, and you can view them with any Web browser. This allows the network administrator to view reports from the road or from any PC on the company's intranet.

The SmartReport, which is generated each night and posted to your Web server, is probably the most useful feature, because it analyzes all of your network devices and provides you with both information on the components that need attention and suggestions for how to deal with potential or actual problems. For example, every night the Monitor generates a report showing any devices with errors, lists them by priority, and explains what's wrong. The SmartReports spare you from having to monitor your devices manually and prioritize which ones need your attention.

Another useful time-saving tool is the failure-analysis report; it shows you a historical usage trend of all network devices. For example, you can see how much data is traveling across a router and determine if you should add another link to increase performance or reduce errors.

Kaspia Automated Network Monitoring System, Version 1.1. List price: Console, \$5,000; \$100 per polling unit. Kaspia Systems Inc., Beaverton, OR; 503-644-1800; fax 503-520-0600; www.kaspia.com. Circle 954 on reader service card.

ISDN ROUTERS

Cisco Fills the Router Gap

By Les Freed

In case you're looking for an ISDN router that fits snugly between single-line boxes and pricier four- and eight-port solutions, Cisco Systems' new 1600 series routers fill the gap. The 1600 product line bears a superficial resemblance to Cisco's 700 series of single-line routers, but the 1600 series routers use Cisco's

industrial-strength Internet-work Operating System (IOS) software, which is also found in Cisco's larger routers. (For more information on ISDN routers, see "Fast Routes to the Net," Network Edition, February 4, 1997.)

We tested the \$1,500 Cisco 1604, which comes with one basic-rate ISDN port and one flexible expansion slot. The slot

First Looks

can host an additional ISDN interface or an async/sync serial interface. The second ISDN port will appeal to users who need more bandwidth than a single ISDN line can provide; the serial interface provides a hedge against obsolescence.

The serial interface operates at speeds of up to 2.05 Mbps, and Cisco offers various cable kits, including RS-232, RS-449, V.35, and X.21. This lets you connect the 1604 to high-speed data services such as frame-relay and X.25.

The 1604 performed well on our tests. We had the product up and running in less than 10 minutes, and we connected to host routers from Ascend, Cisco, and Shiva with no operational glitches. Informal throughput testing confirmed Cisco's claimed 4:1 compression on compressible files.

The 1604 is about the size of a small notebook computer. Eight

front-panel LEDs provide basic status monitoring, and the rear panel provides connections for 10Base-T and AUI Ethernet, ISDN U and S/T interfaces, and a power switch. The rear panel also has the expansion slot and a PC Card socket. The 1604 doesn't have POTS support, but you can connect an ISDN telephone to the S/T interface.

Because the 1604 uses IOS, you can tweak and fine-tune every aspect of the router's operation. But IOS can be intimidating, so Cisco wisely provides a point-and-click user interface for the 1604. The browser-based interface runs as a small HTTP server on the router, so you can install, configure, and monitor the router from any browser on your LAN.

The 1604 includes many of the features of Cisco's larger routers, including Hi/fn data compression and support for Multilink PPP, bandwidth-on-

CROSSTALK



Leon Erlanger

“The market for small ISDN routers is crowded, Frank, as we saw in ‘Fast Routes to the Net.’ With its proven IOS software, Cisco is apparently using its 1600 series router to rise above the crowd. Thank goodness Cisco gave users a way to set the router up that's better than using the old dumb-terminal interface we're used to seeing with IOS!”

“Cisco worked hard on the ‘ilities’ of this little router, Leon; it has great scalability, flexibility, and affordability. This device is ready to meet the wave of increased frame-relay connectivity that we described in our issue of March 25, 1997. You can use your V.35 port for a FRAD connection, so you can have both ISDN and frame-relay WAN links.”



Frank Dorfner

demand, and the Resource Reservation Protocol (RSVP). The 1604 is also one of the first Cisco products to use the network address translation (NAT) protocol, which allows you to connect an entire LAN to the Internet via a single-IP-address

ISP account. An optional IP-to-IPX gateway provides Internet access for IPX-based LANs. **Cisco 1604.** List price: \$1,500. Cisco Systems Inc., San Jose, CA; 800-553-6387, 408-526-4000; www.cisco.com. Circle 955 on reader service card.

MULTIPLE ACCESS By Steve Buehler

The NIC of (Up)Time



Remember *Fail Safe*, the 1963 novel by Eugene Burdick and Harvey Wheeler? This piece of apocalyptic fiction showed how even the most well-designed, carefully thought-out, and redundant systems could fail—in the book's case, with disastrous results. The novel's themes still shape my paranoia about keeping networks up and

running. I'm forever looking into clustering solutions, redundant servers, and any tricks that can keep users up and the business going.

Lots of these solutions—clustering and standby servers, for example—are cost-intensive. Duplicating whole servers for clustering can run into the hundreds of thousands of dollars, but if complete up time is a requirement, we don't have many choices. Many network admins try to identify common points of failure and then build specific solutions on those components to accommodate the possibility of failure. That's why we have redundant power supplies, ECC memory, and even Web server fail-over and load-sharing tools such as Cisco's Local Director.

The most recent—and one of the most affordable—innovations I've seen is the redundant NIC. The NIC and the server's link to the hub are often overlooked points of possible failure. FDDI rings, while redundant, are expensive and somewhat dif-

ficult to recable when you move systems around. New Fast Ethernet NIC and driver products from Adaptec and Compaq now address this danger point.

Compaq (www.compaq.com) has announced its Advanced Network Fault Detection and Correction Feature of the Redundant Netelligent Dual 10/100 NIC (\$419). This driver allows the network administrator to define a controller pair of NICs in a NetWare or Microsoft Windows NT server. Whenever the NICs are idle, they check each other's status to make sure they're both working. If the active NIC fails for any reason, the secondary NIC takes over immediately to ensure that the server can still talk to the network.

Adaptec (www.adaptec.com), the SCSI pioneer, has announced a NIC redundancy product, Duralink. This software suite establishes the same kind of fail-over protection as the Compaq products, but Duralink has two distinct advantages. First, it works with Adaptec's Cogent PCI cards, including the four-port card, Quartet, so users can run and protect multiple segments from one server. Second, the free Duralink fail-over software supports the entire line of Adaptec/Cogent cards, even existing ones. For the price of an additional NIC and the cable to a hub port, you can establish a standby NIC channel for your server in minutes.

How likely is it that your server NIC or link will fail? Not very. But with the investment of a few hundred dollars, you can prevent a *Fail Safe* disaster from putting you and your network into a scene from *Dr. Strangelove*—and we all know how that movie ends.





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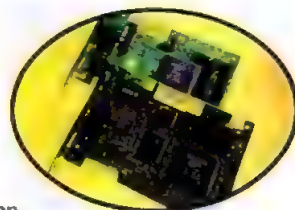
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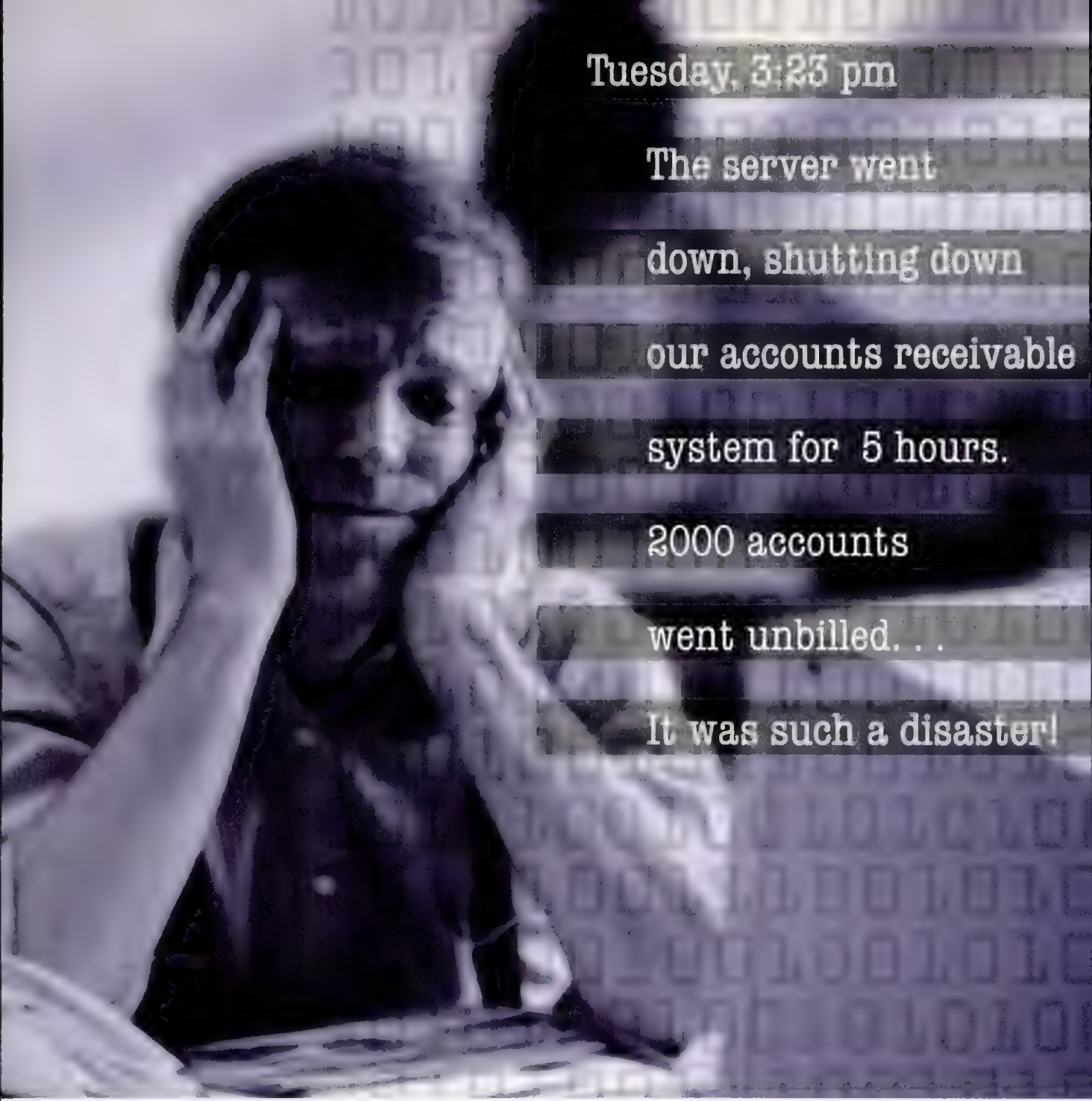
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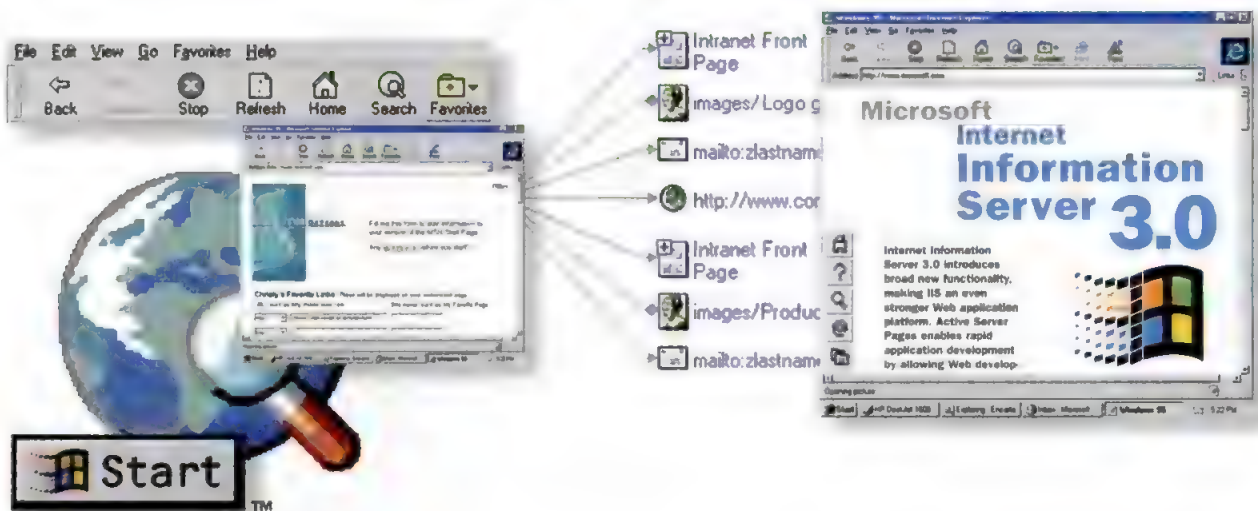
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— ★★★★★ **PC Computing 2/97** —



Well ours. The Dell Dimension XPS M200s just won PC Magazine's Editors' Choice award and was named a price/performance leader. And bested the field in PC Computing's test, too (see graph).

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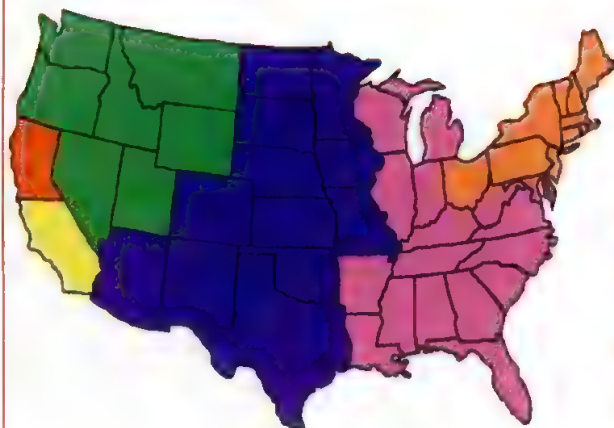
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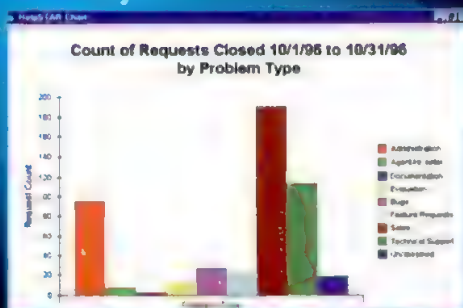
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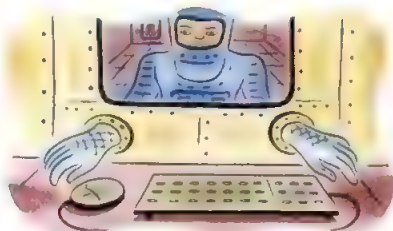
THE 1997

More than 250 utilities to fine-tune your PC and help you

Ahh, the desktop utility! Is there anything as enduring and endearing in the world of desktop computing as your favorite “great little utility”? (Not counting your most prized mouse pad, of course.)

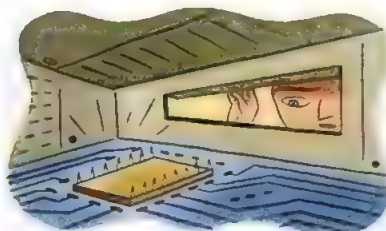
In our previous issue (March 25, 1997), we looked back over 20 years of personal computing and looked ahead to the future of computing technology. We barely touched on the subject of desktop utilities, simply because their nature has changed little over the years. No matter how advanced our hardware and software become, the need for little problem-solvers remains.

These generally small programs, or groups of small programs, certainly do some different things than they did in the early days. Back then it was a really big deal to be able to restore a DOS file you'd accidentally



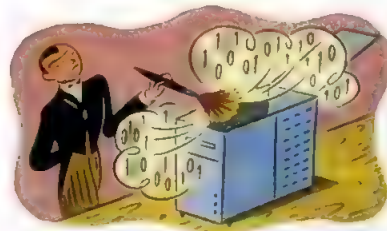
Antivirus Utilities

Computer viruses are proliferating—thanks to the evolution of networked computing. Don't get caught without a powerful utility for battling these desktop demons. **Page 107.**



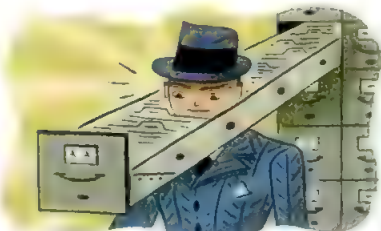
Diagnostic Utilities

These nine diagnostic packages let you pinpoint problems, resolve conflicts, and put your system in tip-top shape. A few can even protect against crashes and recover lost files. **Page 123.**



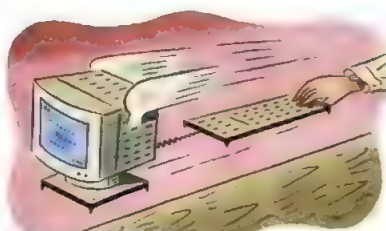
Uninstall Utilities

If your hard disk is starting to look a little cluttered, these utilities can help you safely remove files you don't need—and more. **Page 137.**



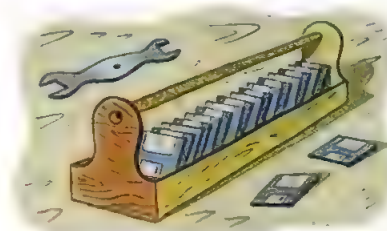
File-View Utilities

Sure, Windows has a basic file viewer. But if you want quick access to a laundry list of file types created on multiple platforms, you'll need one of these handy utilities. **Page 153.**



Performance Enhancers

Looking for a way to speed up your PC without an expensive hardware upgrade? PC Labs tests six utilities that claim to be your answer. **Page 165.**



Miscellaneous Utilities

No matter what you're looking to do, chances are there's a program out there that will fill the bill. We've discovered a variety of top utilities that make life easier. **Page 179.**

UTILITY

be more productive.

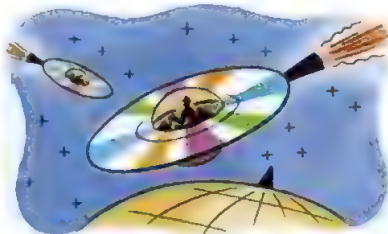
By Gail Shaffer

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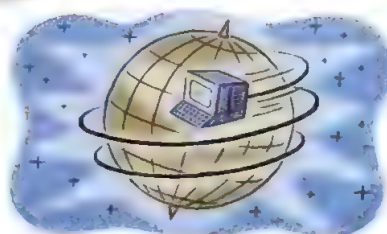
Network Backup

Today's networks demand flexible, cross-platform storage management solutions. These programs safeguard critical NetWare and Windows NT Server data. **Page 187.**



Internet Essential Utilities

Add animation, audio, chat, video, 3-D, search capabilities, and more to your Web browser with one of these plug-ins, ActiveX controls, or helper applications. **Page 199.**



Off-Line Browsers

Who needs to be connected? With off-line browsers, you can browse Web pages even while away from a phone line or your network. **Page 207.**



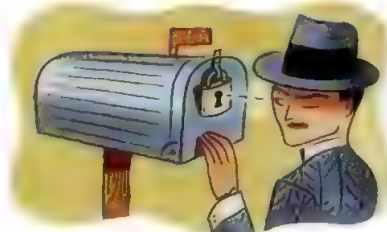
Off-Line Search Utilities

Turn the Web into your personal research library. We look at six off-line search utilities that let you run searches across multiple search engines and organize the results. **Page 227.**



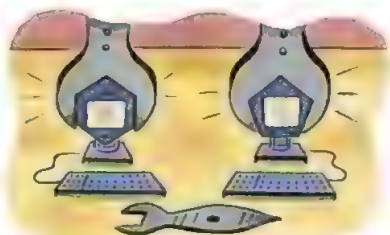
Filtering Utilities

Regulate your children's online and off-line activity with one of these seven filtering tools that let you block access to Internet sites, monitor PC usage, and set limits on applications. **Page 235.**



E-Mail Encryption

Is your e-mail safe? We review six encryption utilities to ensure that your e-mail is securely sent to its intended party without anyone interfering with it. **Page 243.**



OS/2, NT, & Win 3.x Utilities

For users of other OSs, there are plenty of tools to help customize your environment and increase your productivity—desktop enhancers, disk management utilities, and more. **Page 251.**



Join Us Online

Many of the utilities in this year's roundup are available for downloading—either free or for purchase. And we've made it easy for you to do just that. We've set up a Utilities page right on *PC Magazine's* Web site (www.pcmag.com/features/utility) that lists all the utilities covered here. Some you can download outright, some for a trial period. For utilities not yet available online, we'll jump you to the vendors' site. We also hope you'll join our authors and staff online at our Web site from March 24 to 28 to talk about the wonderful world of utilities. **www.pcmag.com.**

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It's In There

Before you start making a shopping list of all the great utilities you plan to buy, try looking a little closer to home. Most of today's robust, feature-rich operating systems already contain many utilities such as diagnostics and uninstall applets. Other features such as off-line browsing will soon be rolled into Microsoft Internet Explorer and Netscape Navigator.

	Microsoft Windows 3.1x and MS-DOS 6.2x	Microsoft Windows 95	Microsoft Windows NT Workstation 4.0	IBM OS/2 Warp 4.0
Antivirus utilities	Microsoft Antivirus for DOS and Windows is included with DOS.	None. But the OS blocks most direct disk access, alerts to changes in the master boot record, and warns of unknown device drivers.	None. But the OS blocks direct disk access.	None. But the OS blocks most direct disk access.
Diagnostic utilities	Versions of Microsoft Diagnostics ship with DOS and Windows.	Device Manager lets you diagnose hardware and drivers. System Monitor provides 59 different monitors of the computer and network.	Windows NT Diagnostics lets you monitor all of your system resources, including hard disks, CPU, adapters, and peripherals.	AskPSP provides a knowledge base of solutions to approximately 10,000 problems.
Performance enhancers	A disk-caching utility called SmartDrive.	VCACHE, an enhanced version of SmartDrive, caches hard disks, and CDFS caches CD-ROM drives.	Disk Cache.	Warp maintains separate caches for FAT partitions, HPFS partitions, and CD-ROMs.
Uninstall utilities	None.	A Control Panel applet lets you add and remove programs that are Windows 95- or Windows NT-aware.	A Control Panel applet lets you add and remove programs that are Windows 95- or Windows NT-aware.	None.
File-view utilities	None.	Quick View ships on the Windows 95 CD-ROM and provides viewers for 30 popular applications.	Quick View provides viewers for 30 popular applications.	None.
Backup utilities	Microsoft Backup for DOS and Windows backs up only to floppy disks.	Microsoft Backup lets you back up to floppy disks or to tape devices.	NTBACKUP.EXE (Windows NT Backup) is included. It lets you back up your local disks and network resources to floppy disks or to tape devices.	None.
Internet utilities	Microsoft Internet Explorer is available for download but is not bundled with the operating system.	Internet Explorer, bundled with the OEM version of Windows 95, handles frames, plug-ins, Java scripts, and ActiveX apps. A newsgroup reader and e-mail utility are included.	Internet Explorer, a newsgroup reader, and an e-mail utility are bundled. Windows NT Workstation also includes Personal Web Server, as well as an FTP and gopher Internet/intranet server. (Personal Web Server is limited to ten concurrent connections.)	A browser called Web Explorer is included. In addition, Netscape 2.02 for OS/2 is available from IBM's Web site.

deleted. Nowadays, utilities can perform tasks such as off-line Internet searches. But the basic idea is the same.

Each utility is created for some targeted, very useful function—to save you trouble or time, or to deliver some nugget of information you can't otherwise get. These products don't have a lot of bells and whistles, but that's what makes them so efficient.

Again this year, we've tested and reviewed 250 utilities or so (from the many

thousands out there) for your consideration. They break out into some 13 areas, including all the standards you'd expect, such as diagnostic and antivirus tools. You'll find all the usual suspects and some interesting new players.

In the course of our research, we turned up far more utilities geared toward Internet work than we did last year (no surprise). They fall into two broad categories of products, the first group aiming to save you time online and the second

group intended to provide protection—usually either a filter for incoming Web content or security for outgoing data traveling over the Internet.

We include sections on miscellaneous desktop and Internet tools. And we asked contributing editor Sheryl Canter to recommend some of the utilities that *PC Magazine* writers and editors have written and offered online over the years. You'll find this piece in our standard Utilities section.

ESSENTIAL UTILITIES from symantec &

By David Haskin

In this issue, we review dozens of software packages that help you tune and prune your PC. But what if you need only the essentials? Here's a look at three utilities—Symantec's Norton Utilities for Windows 95 2.0, Microsoft PowerToys, and Microsoft Plus!—that cover the basics of managing your system, making you more efficient, and, yes, adding a few frills. In fact, we've designated both Norton Utilities and Microsoft PowerToys as overall Editors' Choices among utilities. You shouldn't be without them.

The First Name in Utilities

PC
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EDITORS'
CHOICE

Norton Utilities for Windows 95 2.0 (\$79; Symantec Corp., 800-441-7234, www.symantec.com) is the latest version of a package that has been considered essential since the beginning of the desktop computing revolution. Back then, its most remarkable trick was undeleting DOS files. This version undeletes better than ever, providing a wizard to walk you through the process. Over the years, Norton Utilities has evolved into a series of interrelated programs for system maintenance and protection.

Released after our utility roundup of last year (May 14, 1996), Version 2.0 has more tools for both the technically adept and the novice (late last year Symantec also introduced PC Handyman and Healthy PC, both lower-end diagnostic tools for Windows 95, and both reviewed later in this issue). At the technical end of the spectrum are new Windows 95 Registry tools. Registry Tracker, which can run as a standalone program or in the background, takes snapshots of the condition of your entire Registry or of specific keys. It can do the same with other configuration files, such as WIN.INI, SYSTEM.INI, CONFIG.SYS, and AUTOEXEC.BAT.

If, for example, you install a program that wreaks havoc, you can revert to any Registry version for which you have a snapshot. You

also can edit the Registry with Registry Editor. This new utility has features missing from REGEDIT, such as unlimited levels of undo, search and replace, and bookmarks. Because editing the Registry can be daunting even for experienced users, Registry Advisor describes about 3,000 keys placed in the Registry by Windows and common applications.

Also in this upgrade are Norton CrashGuard and Anti-Freeze. CrashGuard intercepts errors such as page faults, and it lets you save your data to exit your applications cleanly before your system crashes. A dialog box provides the option of fixing the problem, but we found the safest course is usually to restart Windows.

Anti-Freeze works when there are no errors for CrashGuard to intercept and an application has frozen. After Anti-Freeze calls up a Task Manager-like interface, you select the nonresponding program and click a button to unfreeze it. Neither application worked all the time during testing, but they worked more often than not.

Even more helpful may be Norton Utilities' new ability to detect and notify you of viruses. (To repair damage, you still need a standalone antivirus program.) And Norton Utilities can now automatically update virus definitions over the Internet.

System Genie is an excellent hand-holder for configuring about 60 elements of Windows 95. First you tell it what you want to do, whether changing how Windows starts up, looks, or handles files. System Genie provides step-by-step instructions and can load the relevant control panel applets. It supports tweaks ranging from setting a new startup screen to finding Registry keys orphaned by programs you've uninstalled.

Symantec has also beefed up some existing features. The System Information utility now includes benchmark tests of 2-D and 3-D video, audio, and CD-ROM throughput.

They are handy, but we uncovered one irritation: For them to work, you must install a DirectX module and Indeo—a fact that the installation program doesn't tell you. The tests run their course before you learn the error of your ways, and you must run them again after installing the missing modules.

The disk-defragmenting utility Norton Disk Doctor now has Smart Restart. The name is a fancy way of referring to a fix of a design flaw. Previously, if Disk Doctor was operating and you wrote to the disk, it frustratingly restarted from the beginning. Now it won't restart unless it has already defragmented the file to which you wrote.

Norton Utilities is particularly noteworthy for its fine program integration (much of which works via Norton System Doctor), a feature that the previous version



System Genie is a user-friendly application that walks new users through basic processes.

introduced. System Doctor consists of a series of on-screen sensors, giving up-to-the-minute reports on many system functions—from the level of disk defragmentation to various aspects of performance (such as the Windows 95 cache's efficiency).

You can set System Doctor to repair certain problems automatically. For example, if disk fragmentation exceeds a certain level, System Doctor can automatically launch Speed Disk to fix it. You also can set the time when repairs occur (such as nighttime).

microsoft

A Better Face Forward



Norton Utilities does not address some shortcomings of the Windows 95 interface.

For them you'll need another essential set of utilities,

Microsoft PowerToys, available for free at [www](http://www.microsoft.com)

[.microsoft.com](http://www.microsoft.com). The company updates these utilities from time to time but doesn't support them.

The most comprehensive of these tools is TweakUI, which adds itself to the control panel. Are you frustrated because you can't delete items such as the Microsoft Network icon from your desktop? TweakUI has you covered. Does your Add/Remove dialog box list programs even after you've uninstalled them? Nuke them with TweakUI. TweakUI also can control the speed at which menus appear, as well as determining whether the Windows 95 splash screen displays at the time you start and the type of document you can create from the desktop.

The rest of the PowerToys stable is more focused. Fast Folders creates a cascading menu when you click on a folder in Windows Explorer, showing the next folder's contents so you can quickly switch to it. And another of our favorite PowerToys is Explore From Here. Right-clicking the Start button or a folder in My Computer launches Windows Explorer, showing the directory you want to see; no more searching for it.

If you listen to CDs while you work, you'll love the FlexiCD PowerToy. If you click on an icon in the system tray while playing a CD, FlexiCD displays a pop-up menu for functions such as changing volume and tracks.

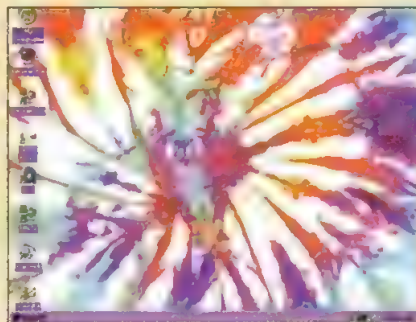
But wait—there's more! If you click on the system tray's QuickRes icon, a menu appears that allows on-the-fly changing of screen resolution and color depth. Another of our favorite system-tray additions is DeskMenu. It displays a pop-up menu showing your desktop icons, so that you don't

need to minimize full-screen applications to launch items from your desktop. There's much more in the PowerToys collection, and you can't beat the price.

Microsoft Plus! (\$54.95; Microsoft Corp., Redmond, WA; 800-936-3500, www.microsoft.com) has its serious side, but it also focuses on adding both fun and precision to the Windows 95 interface. It comes with a variety of desktop themes. For example, the Sixties option supplies tie-dyed wallpaper and replaces your hourglass with a peace symbol.

Plus! adds a tab to the Display Properties dialog box that lets you change icons for desktop items such as Recycle Bin and Network Neighborhood. You also can choose to use larger-than-normal icons and stretch wallpaper to fit the whole screen.

System Agent, a competent but not particularly powerful utility for scheduling unattended operations (such as defragmentation of your hard disk at night), is useful for launching programs. But it can't pass key-



Microsoft Plus! includes desktop themes to personalize your Windows experience further.

strokes to the applications to let them perform specific functions.

Plus!'s most impressive technical feature is DriveSpace 3, which offers UltraPak, a feature for a tighter level of compression. Its Compression Agent automatically recompresses your drive and lets you select which folders and files to compress and even how much to compress them.

Although most of the programs we review in this issue were developed to work with Microsoft Windows 95, many work with both Windows 95 and another flavor of Windows. We've also gathered quite a number of utilities that are exclusively for users of OS/2, Windows NT, Windows 3.x, and DOS.

We know you love your utilities, so we hope that as you read this issue, you'll join us online to discuss your favorite tools with our staff editors and contributing editors. Just go to our Web site (www.pcmag.com) and click on Discuss to find this forum and other great online discussions. In addition, many of the utilities reviewed here are available for download at ZDNet (www.zdnet.com) and other sites.

THE MODEL UTILITY

Many utilities are basic tools that augment your operating system, help you assess or fine-tune it, or improve your hardware's performance or assess its health. Countless other utilities do all kinds of odd jobs that contribute to your productivity but are not essential.

Certainly, each new generation of operating systems incorporates more basic utilities. (See the table in this section, "It's In There.") But no OS will ever have every last tool you could need or want or even dream you might use sometime.

Microsoft provides interesting proof of that. In the accompanying sidebar ("Essential Utilities from Symantec and Microsoft"), we look at the company's PowerToys and Plus! packs of utilities, which are intended to complement Windows 95. (Interestingly, Microsoft posts PowerToys on its Web site for free downloading, but it doesn't offer support for PowerToys as it does for its other products.)

UTILITIES FOREVER!

The PC is far from being a standard consumer product—one that you just buy and plug in. And not everyone wants it to turn into that. So we'll continue to see the utilities market flourish, as long as we're still well acquainted with the PC's guts, in the form of hardware and software settings and the like—and, for that matter, as long as we'd like opportunities to improve our computing experience by ourselves. And you'll continue to see *PC Magazine* cover these great little utilities. □

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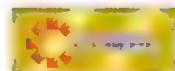
Netscape Navigator™ 2.02 - Internet browser

Envoy™ 1.0a - workgroup and Internet electronic publishing tool

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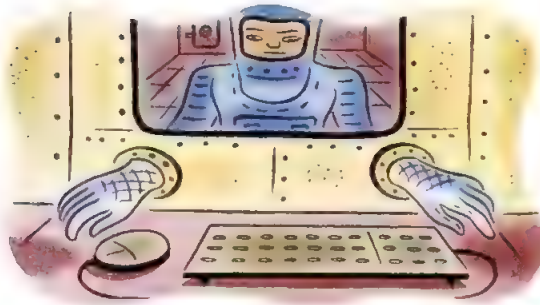
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ANTIVIRUS utilities

In the era of networked computing, new viruses are cropping up constantly. Our testing revealed several utilities that are strong medicine for computer viruses. *By Barry Simon*

PC virus attacks are a fact of computing life. When they strike, there's a good chance you'll lose both time and data. So you'd be well-advised to have a strategy in place to cope with this threat. And a good antivirus program is the linchpin of such a strategy.

To find a reliable antivirus program, we tested ten packages that run under Microsoft Windows 95. All these programs have three main functions: to scan your hard disk for infected files, to repair infected files, and to monitor your system continuously via a memory-resident program providing real-time protection. In addition to catching viruses, monitors can detect virus-like activity.

In order to detect the bulk of the 8,000 or so known viruses, the programs rely on files that store the telltale signatures of these monsters. According to some estimates, three new viruses emerge per day. In December 1996 alone, 44 new macro viruses were reported by one watchdog group. Although these reports might be alarming, it should also be noted that only a fraction of reported viruses are actually detected "in the wild."

Clearly, it is essential that an antivirus program allow you to update its signature files on a regular basis, and we looked closely at how easy it was to do that with each product. In an ideal world, every antivirus

program would check the date of its signature file upon boot-up, warn you if the file was out-of-date, and offer to update it for you automatically. But when we set the system clock forward six months on our test-bed and ran each scanner, only McAfee Associates' VirusScan Deluxe for Windows 95 provided such a warning and offered to update the files. (Oddly, IBM AntiVirus will warn you only if the files are at least seven months out of date.) And of the others, only Dr. Solomon's AntiVirus Toolkit for Windows 95 and TouchStone Software's PC-cillin II even noted on a subdialog that the file was out-of-date.

Overall, we were pleased that so many of the programs did extraordinarily well at identifying viruses during the testing for this roundup. Three programs notched perfect scores on all the National Computer Security Association (NCSA) tests, except for the specialized test that includes viruses found only in the lab, or Zoo, and not yet known to have infected any users. (The NCSA conducts a certification program for antivirus software.)

All in all, we discovered that you now have several excellent choices when it comes to antivirus protection. There's no longer any excuse for not having an antivirus program installed on your system. After all, can you really afford to be caught without one?



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Cheyenne Software,
a division of Computer Associates Inc.

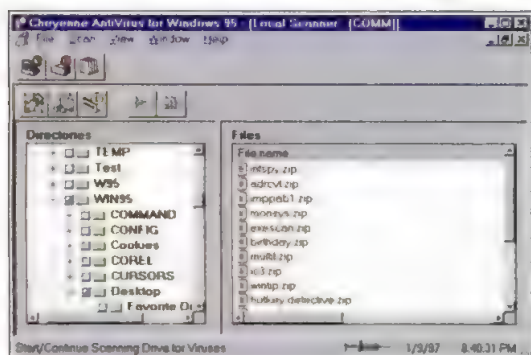
Cheyenne AntiVirus for Windows 95

A speedy scanner and a solid performer on the NCSA tests, Cheyenne AntiVirus for Windows 95, Version 4.0 (\$50 street), also lets you schedule background updates of the virus's signature files, so you won't have to worry about forgetting to do it yourself. But Cheyenne AntiVirus—formerly known as Innoculan, a name Cheyenne retained with its client/server network antivirus product—is most notable for its network smarts.

Cheyenne AntiVirus is one of a family that includes antivirus products for Windows 3.x, Windows NT Server, Windows NT Workstation, DOS, Macintosh, and NetWare. Cheyenne provides add-ons at an extra cost for Microsoft Exchange and Lotus Notes mail. It also offers a helper application for Netscape Navigator or Microsoft Internet Explorer. But the detection engine in Cheyenne AntiVirus missed two WildList file viruses and, like IBM AntiVirus, was able to repair only 7 out of 13 macro-infected files. (Five of the 10 products could repair all 13, and two others fixed 12 of the 13.)

Cheyenne AntiVirus receives kudos for having one of the speediest file scans, and it gave a respectable showing for scans inside .ZIP files. Its numerous automation capabilities are also noteworthy: On a regular basis, you can schedule updates via the Internet, BBS, or over a network.

The network update is just one example of several special features that make Cheyenne AntiVirus so well suited for LANs. You can also store rescue disks on a server so that you can access them from a client PC. The scanner directory dialog



Cheyenne AntiVirus uses an Explorer metaphor so you can easily choose which files to scan.

includes a Network Neighborhood branch, making it easy to set up scans of several drives over a network. You can install a component of the program as a helper application for Netscape Navigator or Microsoft Internet Explorer, and then you can have it scan downloads as they come in.

Some of Cheyenne AntiVirus's other features are less impressive. Each time you start the scanning component, for example, it reads the directory tree on every local and mapped drive on your computer. This causes a noticeable delay on some systems. But with its innovative network features, Cheyenne's AntiVirus for Windows 95 should appeal to those who administer PCs running Windows 95 on LANs.

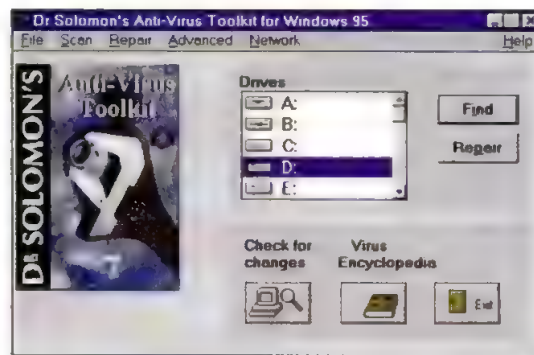
Cheyenne AntiVirus for Windows 95 4.0. Street price: \$50. Requires: 486-based PC or better, 16MB RAM, 6MB hard disk space, Microsoft Windows 95 or later. Cheyenne Software, a division of Computer Associates Inc., Roslyn Heights, NY; 800-243-9462, 516-465-5000; fax, 516-484-3446; www.cheyenne.com. *Circle 503 on reader service card.*

Dr Solomon's Software Inc.

Anti-Virus Toolkit for Windows 95

Despite its generally strong performance, Dr Solomon's Anti-Virus Toolkit for Windows 95, Version 7.66 (\$85 street price) still suffers from slow scanning and a number of interface quirks. But AntiVirus for Windows 95 (\$50 street price), a new product from Dr Solomon's that's scheduled to ship by the time you read this, will address some of the interface issues and add the ability to download updates via the Internet.

Dr Solomon's Toolkit includes versions for Windows 3.x, Windows 95, DOS in the same box. Apart from the scanner, a separate utility computes, stores, and later compares file checksums. You can even turn on heuristic scanning to search for unknown viruses. Overall, Dr Solomon did well on the NCSA test suite, posting perfect scores on the WildList, boot cleansing, and macro repair tests. It also had an impressive 99.3 per-



Dr Solomon's Toolkit lets you choose which drives to scan from the main screen.

cent score on the Zoo test. But its file scanning of an entire disk was among the slowest of the products we tested.

Besides the basic scanner, the package includes a well-implemented scheduling module and a memory-resident WinGuard that catches viruses as they are opened, launched, or copied to your system. As a whole, Dr Solomon's Toolkit performed admirably. The program's scanner caught every virus on the WildList, and the memory-resident module had little effect on overall system performance. WinGuard appears as an icon in the notification area, but the scheduler unfortunately takes a full slot on the Taskbar. You can subscribe to virus-definition updates via mail but not via the Internet.

Dr Solomon's install program doesn't understand long filenames, so it refused to accept an install directory with a name consisting of more than eight characters. To make matters worse, it regarded the tilde (~) as an invalid character, so we were unable to use files translated to the 8.3 format by Windows.

If the scanner finds an infected file, it won't automatically go into the repair mode. Instead, you have to exit the scan module and then run the separate repair module. And the scanner displays one infected file at a time.

Despite these shortcomings, Dr Solomon's Toolkit's solid underlying technology—combined with a resident program that goes easy on your system—will make this the program of choice for some. We'd be even more enthusiastic if its interface were better designed.

Dr Solomon's Anti-Virus Toolkit for Windows 95, Version 7.66. Street price: \$85. Requires: 486-based PC or better, 8MB RAM, 6MB

Editors' Choice

• Norton AntiVirus 2.0 for Windows 95



Selecting an Editors' Choice product among antivirus programs was especially difficult this year for a simple

reason: They're getting good at what they do. As our test results indicated, the majority of these programs can detect most of the viruses found in the wild.

When we dug a little deeper, we found that all of the antivirus products we tested, including last year's Editors' Choice winner, Norton AntiVirus for Windows 95, could use some improvement. Nevertheless, for overall virus protection in a package that's easy to use and update, our Editors' Choice pick is Norton AntiVirus 2.0 for Windows 95 (NAV).

Like most of the products tested here, NAV is certified by the NCSA to protect against known viruses, and it performed as billed. NAV was one of four antivirus programs that detected all of the viruses on the NCSA's WildList (the viruses you're most likely to encounter). The program performed equally well on macro viruses. By default, NAV scans the largest selection of file types among the products tested, but its scanner was one of the slowest on our tests. Faster

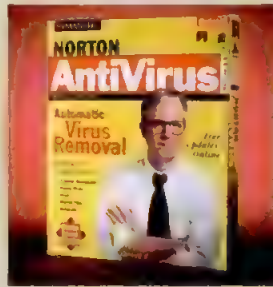
and more selective scanning would greatly enhance this product.

Test results alone don't set NAV apart, but its clean, easy-to-use interface remains impressive. Wizards guide you through scanning and disinfecting chores, and Symantec's LiveUpdate feature makes it simple to upgrade the virus-definition files. Updates are free for the life of the product. We did have one major reservation about NAV, though: Its memory-resident module caused an 8 percent decrease in system performance. Only PC-cillin II had the same performance hit.

A couple of other programs warrant mention. A newcomer to the U.S. market, ViruSafe 95 also scored perfectly on the WildList test. Its \$79 list price includes a year of product upgrades as well as updates to the virus-definition files via the Internet. But like NAV, ViruSafe could use a faster scanner. In addition, we quickly grew weary of the program's animated sequences.

PC-cillin II also garnered an honorable mention for its perfect scores across the board on NCSA tests. Not only did PC-cillin catch all of the WildList viruses during testing, but it also recognized all 2,631 viruses in the NCSA zoo. Unfortunately, PC-cillin's memory-resident module caused a significant performance hit. We also found the program's scanner to be a little too aggressive in its efforts to root out virus-like activity.

Although finding the perfect antivirus program remains an elusive goal, the good news is that several compelling options do exist.

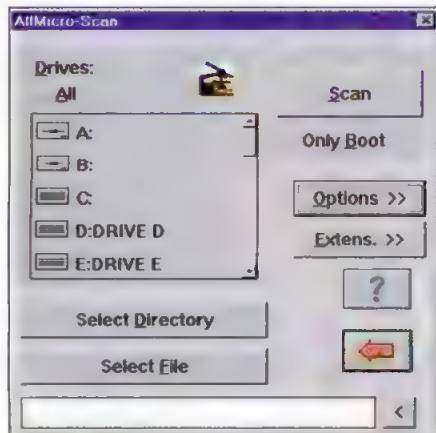


hard disk space, Microsoft Windows 95 or later. Dr Solomon's Software Inc., Burlington, MA; 888-377-6566, 617-273-7400; fax, 617-273-7474; www.drsolomon.com. **Circle 504** on reader service card.

The ForeFront Group Inc.

ForeFront Anti-Virus Survival Kit

One function of paramount importance dictates the success of antivirus software packages: locating and removing viruses. Although almost all of the products in this roundup did very well at this basic job,



ForeFront (shown here under its old moniker) uses nonstandard dialogs.

The ForeFront Group's Anti-Virus Survival Kit did so badly on the NCSA tests that we consider it unacceptable as an antivirus solution.

ForeFront (\$129 list) missed 40 percent of the WildList, the viruses that you are most likely to encounter. It failed to catch 58 of the 133 file viruses and 30 of the 90 boot viruses. In addition, while every other program caught at least 98 percent of the Zoo viruses, ForeFront found only 87.8 percent. The current version of ForeFront can't disinfect macro viruses, including the Word.Concept virus—the macro virus that has been responsible for a quarter of all wild infections in recent months.

The package includes Windows 3.x, Windows 95, and DOS versions of the programs. The main defense scans for known viruses, but the program also looks for unknown viruses using heuristics and by scanning for suspicious strings.

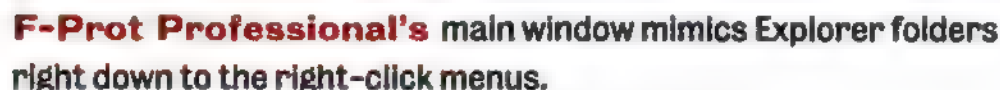
Even if it hadn't done disastrously on the critical virus test, ForeFront still would not have fared well overall. Unlike some antivirus products, ForeFront offers no way to upgrade virus-definition files for free over the Internet. Instead, you can subscribe to quarterly updates of the whole program (executables as well as the

definition files) for an annual fee of \$100. And you still have to download the program from The ForeFront Group's Web site or BBS and install it yourself.

The resident module automatically loads if you've installed the package, but the program offers no way to turn off this autoloading except by uninstalling the entire package. Worse, if you uninstall the package, it deletes the entire Run key of the HKEY_LOCAL_MACHINE branch of the Registry, including the start-up for Scheduler (part of the Microsoft Plus! Pak) and any other program that places its start-up there.

Finally, ForeFront forsakes Windows 95 conventions in favor of file and directory dialogs and dialog boxes that have their own look and feel. In short, ForeFront Anti-Virus Survival Kit needs work on all fronts before it will be worthy of consideration.

ForeFront Anti-Virus Survival Kit 4.0. List price: \$129. Requires: 486-based PC or better, 8MB RAM, 1.2MB hard disk space, Microsoft Windows 95 or later. The ForeFront Group Inc., Clearwater, FL; 800-653-4933, 813-724-8994; fax, 813-726-6922; www.ffg.com. **Circle 505** on reader service card.



F-Prot Professional for Windows 95

F-Prot Professional is one of a family of products that includes versions for Windows 3.x, Windows NT, DOS, OS/2, and NetWare. The program uses heuristic methods to try to locate unknown viruses. It did perfectly on the macro clean and

F-Prot Professional lets you set up multiple tasks; each task can involve a single drive, a single directory, each local drive, or all drives including network drives. You can arrange to have the resident program start a particular scan task

after a prescribed time of no system activity. The task setup module will be familiar to veteran Windows users because it uses the folder metaphor (with large icon, small icon, and details views) and a right-click menu that lets you change the parameters of a task.

We were disappointed with F-Prot Professional's lack of alarm when it encountered a virus—just a quiet beep and a small dialog box summarizing the results of the scan. The product also fails to offer the option of removing the contaminant by default. Since the information about infections scrolls out of your visible window, you can easily miss what the program is doing or wrongly assume that a detected virus has been taken care of. Every task has a properties dialog in which you can configure F-Prot Professional to either disinfect automatically or disinfect at a user prompt (novice users may have trouble locating this dialog).

Overall, F-Prot Professional is a solid antivirus product, but it lacks some of the

Virology 101

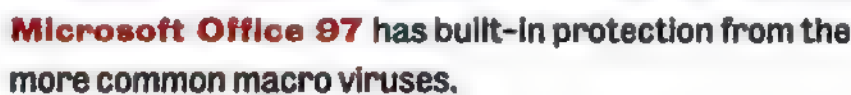
But if you *run* code downloaded off the Internet, you can contract a virus, so you should consider scanning file downloads before installing them. You should also be careful with attachments to e-mail that are executable files. It also means that viruses spread via Java or VB Script code or with ActiveX components are a potential concern for the future.

Executable virus code generally attacks in three ways: by adding itself to executable files, by infecting the boot sector of your disks (note that during system start-up, code in the boot sector runs automatically), or via macros. While macro viruses are a recent phenomenon, they topped the Virus Bulletin list of reported virus attacks (www.virusbulletin.com)

Almost all reported macro viruses infect Microsoft Word, although a few Excel, Ami Pro, and 1-2-3 macro viruses exist. Events such as opening, closing, or saving a file can trigger a macro virus. Macros can live only inside a Word template (normally, a .DOT file) and not inside an ordinary document (normally, a .DOC file). Most often, infected files are templates that have a .DOC extension and therefore look harmless. Once

Microsoft itself has a few defenses in place. Copies of Word that shipped since January clean out known macro viruses when upgrading. Word 97 warns you if a file you are opening has macros and offers not to load them. If you get such a warning on a .DOC file that you didn't know was a template, be sure not to load macros.

Polymorphic viruses, on the other hand, change their form with each reproduction, typically by encrypting themselves with a randomly generated encryption code. By storing this code with the copy, the virus can unencrypt itself once it's in memory. Different antivirus products use different strategies to cope with polymorphic viruses. As NCSA's test results show, these products are largely successful in coping with polymorphic viruses, a welcome change from last year's tests.





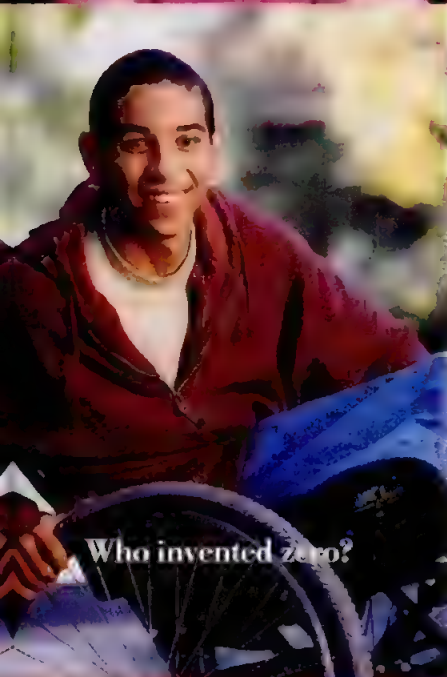
Who won the first Oscar?



How many eggs does a spider lay?

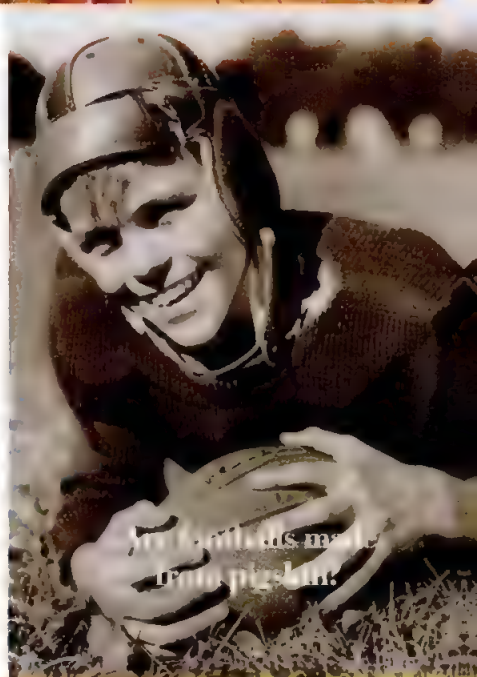


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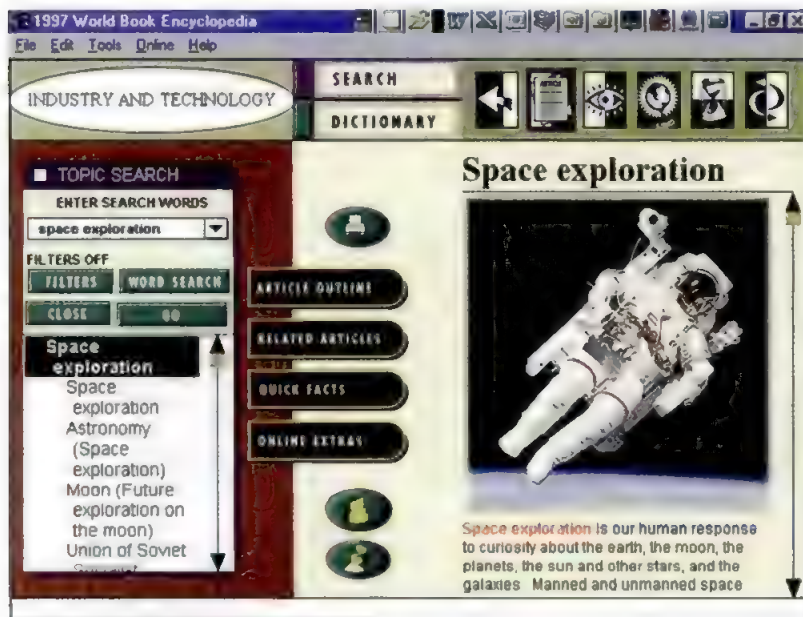
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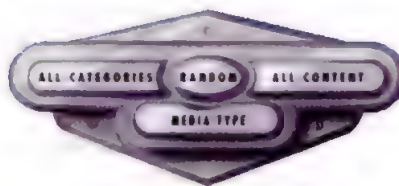
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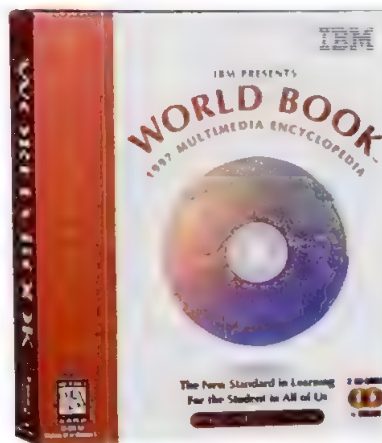


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PERFORMANCE TESTING

Antivirus Utilities



Several factors need to be considered when choosing an antivirus software program, but the number-one factor has to be virus detection. If the program can't spot a virus, then none of the other factors matter.

What the Numbers Mean

As we did last year, we contracted with the National Computer Security Association (NCSA) to test each product's ability to identify viruses. The NCSA (www.ncsa.com) is an independent organization that conducts a program to certify antivirus software that successfully detects all viruses on the WildList. Compiled by Joe Wells, an antivirus industry consultant, the WildList lists all viruses detected recently outside of a laboratory environment.

With the exception of ForeFront Anti-Virus Survival Kit and ThunderByte Anti-Virus Utilities, all the products tested have been certified by the NCSA, so we weren't surprised that the scores on the Wild virus test were generally high. We were a bit surprised, however, that some previously certified products missed a few viruses that were not new to the WildList. (Our test was based on the October 1996 WildList.) But the NCSA noted that such anomalies are common and that future virus definition and program updates should catch these viruses again.

In addition, we tested all programs using the NCSA's Zoo of 2,631 laboratory viruses. These results are not as significant as the real-world test scores.

Disinfection of contaminated files has always been a controversial subject. Some vendors will try to remove the entire virus while others, concerned that removing too much code may actually damage the original file, will try to remove only enough to disable the contaminant. Still others have contended that the only way to be assured of removing a virus is to delete the entire infected file. But macro viruses have made these arguments moot. Though it may be practical to delete an infected program file and reinstall a

clean copy, users will not tolerate losing work by deleting infected word processing documents and spreadsheets. Macro viruses must be removed without destroying the carrier. We tested the disinfection capabilities of the programs against 13 Microsoft Word and Excel macro viruses.

We were extremely impressed by PC-cillin II's perfect score on all three NCSA tests. We were a bit concerned, however, with the timeout errors we received when PC-cillin was installed; it appears that the product might be too aggressive in searching out virus-like activity. At the opposite end of the spectrum, ForeFront's performance was unacceptable. The program missed about 40 percent of the Wild viruses and 12 percent of the Zoo viruses, and it does not disinfect macro viruses.

A proper routine for keeping a system free of viruses includes regular scanning. We tested how long it took each program to scan a typical system (a Gateway Pentium/120 PC with 16MB of RAM and a 1.6GB hard disk) loaded with Windows 95, Microsoft Office, Lotus Notes, and more than 1,000 documents and spreadsheets. We ran two tests using this test-bed, first scanning all the files recognized as "program files" and then scanning every file on the hard disk (except for compressed files). Because each program has a different definition of a program file, we measured throughput rather than time in order to gauge scanning speeds accurately.

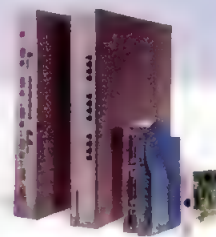
Although a virus cannot infect a system from within a compressed file, most vendors agree that it's prudent to look inside these files to find viruses before they have a chance to attack. We scanned a hard disk filled with 25MB of compressed files in PKZIP format. Most of the programs were able to complete the test in under a minute. VirusScan Deluxe, on the other hand, took over 4 minutes, a problem previously noted in a First Looks review (December 17, 1996).

Finally, readers often mention to us that memory-resident utilities such as virus-prevention modules have a significant effect on system performance. To test this, we ran the ZD Winstone 97 benchmark tests on the Pentium/120 PCs with each antivirus product loaded. Performance degradation ranged from imperceptible with IBM AntiVirus to approximately 8 percent with either Norton AntiVirus or PC-cillin. Although users are unlikely to notice a performance hit of less than 10 percent, we still feel that the 8 percent mark may be too much.—*Analysis written by Ben Z. Gottesman and Jonathan Wheat*

▲ Higher scores represent better performance. ▼ Lower scores represent better performance. Bold type denotes first place.	Detection		Disinfection Macro Viruses ▲	Scanning					Performance Decrease (measured with Winstone 97) ▼
	WildList ▲	Zoo ▲		Program files (number)	Program files (total MB)	Program files (speed, in MBps) ▲	All files (speed, in MBps) ▲	Compressed files (speed, in MBps) ▲	
Cheyenne AntiVirus for Windows 95	99.1%	99.5%	53.8%	1,898	152	2.9 ¹	2.9	0.4	3%
Dr Solomon's Anti-Virus Toolkit for Windows 95	100.0%	99.3%	100.0%	1,825	150	2.6	2.0	0.5	2%
ForeFront Anti-Virus Survival Kit	60.5%	87.8%	N/A*	830	135	3.4	3.6	N/A**	1%
F-Prot Professional for Windows 95	99.6%	98.2%	100.0%	2,004	155	2.3	2.3	0.4	4%
IBM AntiVirus	99.6%	98.7%	53.8%	2,014	155	3.5	3.7	0.6	0%
Norton AntiVirus for Windows 95	100.0%	98.9%	100.0%	2,114	162	2.0 ¹	2.5	0.3	8%
PC-cillin II	100.0%	100.0%	100.0%	1,407	72	1.2 ¹	1.7	1.2	8% ²
ThunderByte Anti-Virus Utilities	98.2%	99.2%	92.3%	1,895	151	3.7	2.7	N/A†	N/A††
VirusSafe 95	99.6%	99.3%	92.3%	1,372	72	0.9	1.3	0.7	5%
VirusScan Deluxe for Windows 95	98.7%	98.1%	100.0%	1,192	66	1.9	2.6	0.1	4%

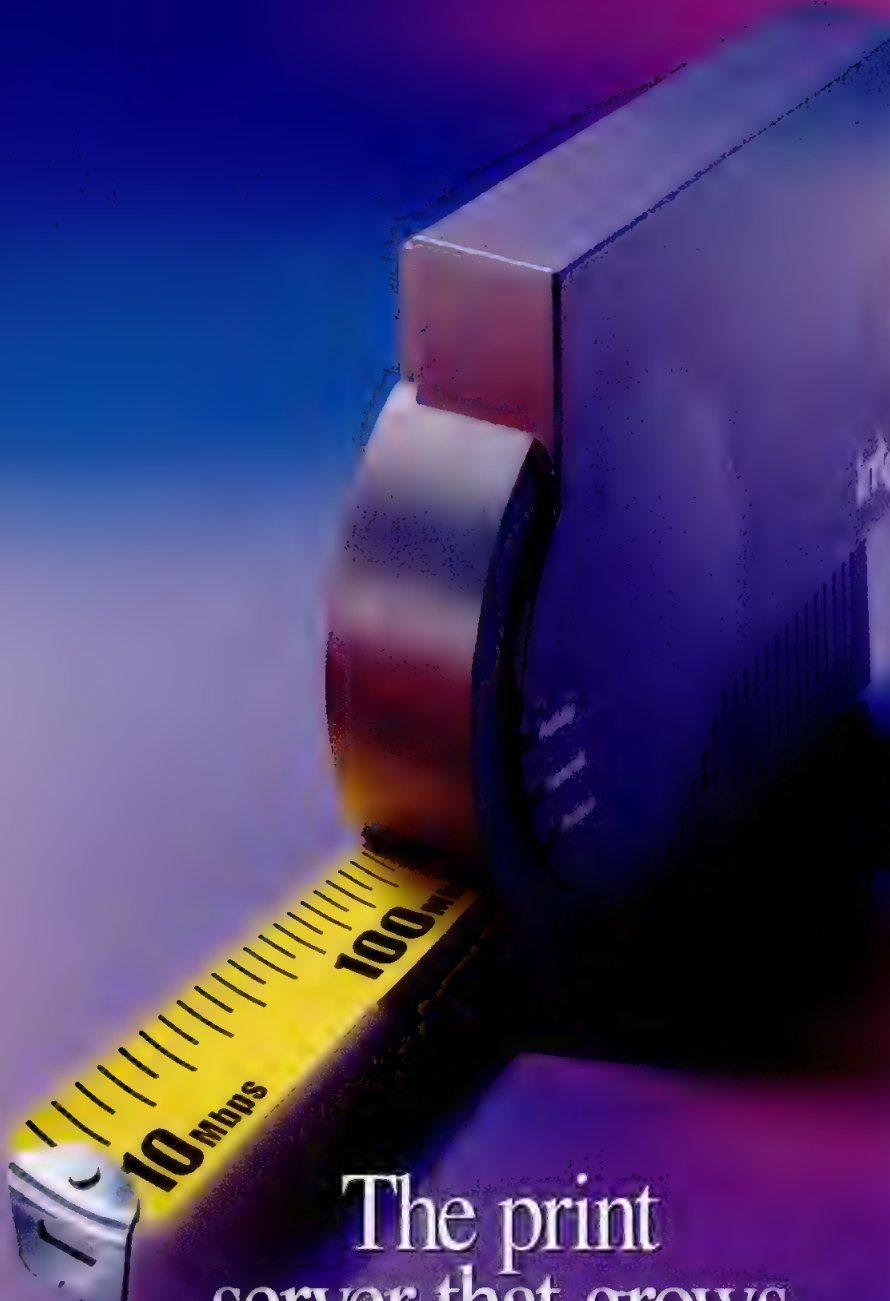
(1) The program file scan included two ZIP files totaling 700K. (2) PC-cillin could complete this test only with the Check on File Open option disabled. With this option enabled, performance is likely to be worse.
N/A*—Not applicable. This product could not disinfect macro viruses. N/A**—Not applicable. This product did not recognize all viruses. N/A†—Not applicable. This product does not scan compressed files.
N/A††—Not applicable. This product did not complete the Winstone 97 tests.

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bells and whistles—automated updates and an interface accessible to novices—of similarly priced competitive products.

F-Prot Professional for Windows 95 2.24c. Street price: \$90. Requires: 386-based PC or better, 4MB RAM, 4MB hard disk space, Microsoft Windows 95. Command Software Systems Inc., Jupiter, FL; 800-423-9147, 561-575-3200; fax, 561-575-3026; www.commandcom.com. *Circle 506 on reader service card.*

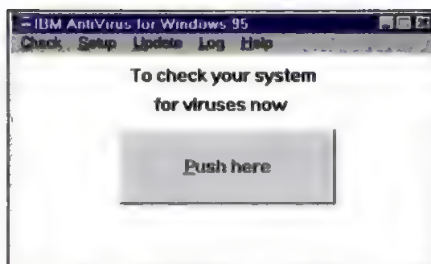
IBM Corp.

IBM AntiVirus

With some interesting technology and adequate virus detection, IBM AntiVirus comes with Windows 3.x, Windows 95, DOS, and OS/2 versions in one box. But poor macro virus repair and a sometimes awkward interface mar its overall performance. The program uses neural network technology to try to locate unknown viruses that could infect the boot record.

We tested Version 2.5.1 of IBM AntiVirus (\$49 list price). On the NCSA tests, the program ranked in the middle, missing one of the viruses found on the WildList and cleaning only 7 out of 13 of the macro-test infections. Its scanning speed, however, was the fastest overall among the group. And when enabled, its System Shield memory-resident module had a minimal impact on system performance.

While the scanning program is a 32-bit



IBM AntiVirus keeps it simple with a plain-looking interface.

Windows 95 application, the interface has an ad hoc Windows 3.x feel. The design is sometimes less than friendly. For example, if you just want to scan a single directory, the dialog is not only unlike any we've seen, but it also presents directories in a seemingly random rather than alphabetical order.

In addition, the install program had trouble with directories with long filenames. The directory-search dialog displayed such filenames and entered them in the dialog, but the dialog required the short filenames to continue. To find the date of your current virus signatures, the program's manual instructs you to open a DOS box and use the type command—an awkward process. (The file is binary, not ASCII, so you can't even open it with Notepad.) The information is also available in the program's log file, but IBM AntiVirus hasn't documented that option.

IBM has just announced Version 2.5.2, but it was not available in time for testing. This version promises to provide protection against Office 97 macro viruses. All told, IBM AntiVirus is a program with a solid underlying technology that deserves a better user interface.

IBM AntiVirus 2.5.1. List price: \$49. Requires: 386-based PC or better, 4MB RAM, 4MB hard disk space, Microsoft Windows 3.1 or later, or Windows 95. IBM Corp., Sterling Forest, NY; 800-742-2493, 512-434-1554; fax, 512-434-1536; www.av.ibm.com. *Circle 507 on reader service card.*

Symantec Corp.

Norton AntiVirus 2.0 for Windows 95



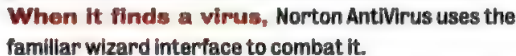
Strong virus-checking capabilities plus an easy-to-use interface have positioned Symantec's Norton Anti-Virus (NAV) 2.0 for Windows 95 (\$70 street) as a solid upgrade to our last year's Editors' Choice-winning product. Also included is Netscape Helper, which checks for viruses during file downloads.

NAV did well on the NCSA tests, posting perfect scores on the WildList, boot-sector, and macro-repair tests. NAV did not fare as well on performance tests, posting an average time on the total-scan test and among the slowest times on the .ZIP scan-time test. More seriously, its

SUMMARY OF FEATURES

Antivirus Software

	Cheyenne AntiVirus for Windows 95 4.0	Dr Solomon's Anti-Virus Toolkit for Windows 95 7.66	ForeFront Anti-Virus Survival Kit 4.0	F-Prot Professional for Windows 95 2.24c	IBM AntiVirus 2.5.1	Norton AntiVirus 2.0 for Windows 95	PC-cillin II 2.0
■ YES ■ NO							
Products listed in alphabetical order							
Price	\$50 (street)	\$85 (street)	\$129 (list)	\$90 (street)	\$49 (list)	\$70 (street)	\$50 (street)
Includes or makes rescue disk	■	■	■	■	■	■	■
Includes native uninstall feature	■	■	■	■	■	■	■
Scans memory during installation	■	■	■	■	■	■	■
Scans boot sector	■	■	■	■	■	■	■
Makes backup of master boot record	■	■	■	■	■	■	■
Makes backup of partition table	■	■	■	■	■	■	■
Scans compressed files	■	■	■	■	■	■	■
Scans memory	■	■	■	■	■	■	■
Schedules automatic scans	■	■	■	■	■	■	■
Reports scan results on-screen/in file log	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■
Scans files on access	■	■	■	■	■	■	■
Detects and removes Word macro viruses	■	■	■	■	■	■	■
Virus-list updates available via BBS or Internet	■	■	■	■	■	■	■
Update is automated	■	N/A	N/A	N/A	■	■	■
Includes browser helper application	■	■	■	■	■	■	■
N/A—Not applicable. The product does not have virus-list updates.							



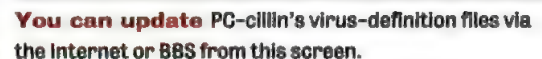
The NAV interface is especially gentle when the scanner finds a virus. The wizard interface and graphics are comforting, and several buttons lead you to additional information along the way. NAV also locates new polymorphic viruses that it doesn't already know. Its scanner sets up a virtual computer that emulates a CPU in code, and this virtual CPU starts to run every executable file. Symantec says that for most programs it takes only a few bytes of code to perform this test, so you shouldn't notice any im-

You can easily set up a scan of one or more local hard drives. But if you want to scan specific files, directory branches, or network drives you have to scan one at a time.

Norton AntiVirus 2.0 for Windows
95. Street price: \$70. Requires 486-based PC or better, 8MB RAM, 12MB hard disk space, Microsoft Windows 95. Symantec Corp., Cupertino, CA; 800-441-7234, 541-334-6054; fax, 541-334-7400; www.symantec.com. *Circle 508 on reader service card.*

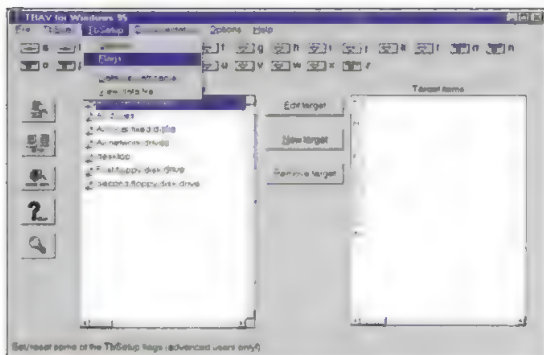
PC-cillin was the speediest program at scanning inside .ZIP files. We did a quick test in which we copied .ZIP files that contained viruses from a floppy disk to the hard disk. None of the memory-resident modules that we reviewed detected the virus inside the .ZIP files—except PC-cillin.

PC-cillin goes farther than any of the



PC-cillin II 2.0. Street price: \$50. Requires: 486-based PC or better, 6MB RAM, 11MB hard disk space, Microsoft Windows 95 or later. TouchStone Software Corp., Huntington Beach, CA; 800-531-0450, 714-969-7746; fax, 714-960-1886; www.checkit.com. *Circle 509 on reader service card.*

ThunderByte Anti-Virus Utilities 7.06	VirusSafe 95 2.1	VirusScan Deluxe for Windows 95
\$100 (street)	\$79 (list)	\$60 (street)
		
		
		
		
		
		
		
		
		
		
		
		
		
		
		



ThunderByte has a more technical-looking interface than other antivirus programs do.

Authentex Software Corp.

ThunderByte Anti-Virus Utilities

Though Authentex's ThunderByte Anti-Virus Utilities comes with versions for Windows 3.x, Windows 95, Windows NT, and DOS (as well as extra-cost versions for 16- and 32-bit networks plus a Microsoft Exchange add-on), the program was an average performer on the virus tests. ThunderByte also has a rather technical interface that you may find difficult to use.

ThunderByte (\$100 street price) uses heuristic methods to protect against unknown viruses. The program missed four viruses on the WildList test, giving it a low score, but it was able to repair 12 of the 13 macro viruses on the NCSA macro-repair test. This would have been a respectable showing in previous years, but it wasn't enough to set ThunderByte apart in light of the stiffer competition we saw this year.

ThunderByte is unable to scan inside .ZIP files, a serious shortcoming when you consider that many files downloaded from the Internet are compressed. For an extra cost, Authentex does offer a version of ThunderByte with Exchange, Microsoft's messaging product (it should also include Outlook, Microsoft's information manager, by the time you read this). Although this add-on can scan file attachments, the lack of support for searching inside .ZIP files is still a big limitation.

When a virus is found by the scanner or resident program, the dialog that pops up lists a variety of options (such as "clean" or "delete") in a straightforward manner. But the information in the dialog about virus heuristics and the terminology used may baffle the less sophisticated user, who is bound to prefer the hand-holding in Norton AntiVirus.

Scanning a single directory without any of its subdirectories is possible but very awkward to set up (you must change the global options before the scan and then change them back afterwards). And unlike several other products reviewed here (such as Norton AntiVirus and PC-cillin), ThunderByte can't automatically update virus-definition files. Nevertheless, you can configure the program to scan after a specified period of inactivity.

Basically, ThunderByte has not kept up with the competition, and we recommend you look elsewhere.

ThunderByte Anti-Virus Utilities 7.06. Street price: \$100. Requires: 386-based PC or better, 8MB RAM, 2MB hard disk space, Microsoft Windows 95 or later. Authentex Software Corp., Kanata, Ontario, Canada; 888-665-8228, 613-599-5584; fax, 613-599-9460; www.authentex.com. *Circle 510 on reader service card.*

EliaShim Inc.

VirusSafe 95

With a good scanner, slick Internet functionality, and an impressive resident protection module, EliaShim has produced one of the stronger entries in the antivirus software field: VirusSafe for Windows 95. Versions for Windows NT, Windows 3.x, DOS, and NetWare are available.

VirusSafe includes a WebWizard that locates any browsers on your system and offers to install virus-checking modules for them. The program uses a variety of scanning strategies, including the use of checksums and an analysis method that looks

for suspicious activity and code.

VirusSafe (\$79 list price) performed well on the NCSA tests, with a solid score on the WildList test. It missed one virus on both the macro-repair and boot-sector tests but did especially well on the Zoo test.

VirusSafe's scanning throughput on program and other files was anemic, but its .ZIP scans were near the top of the class. It had a 5 percent system performance loss, however, while its resident guard program was running; only Norton AntiVirus's and PC-cillin's monitors had a greater impact.

You trigger VirusSafe's Update feature (similar to that found in Cheyenne AntiVirus, VirusScan Deluxe, Norton AntiVirus, and PC-cillin) with one button. The program makes an FTP connection to the EliaShim site, downloads the update, and runs setup to install the update.

Unfortunately, a few glitches annoyed us. Every time the scanner loads, it insists on displaying a 10-second animation (you can disable this with an undocumented command-line switch written as */noavi*). And after disinfecting a virus, when you are most likely on the edge of your seat, the program plays a startling siren. But these minor complaints aside, VirusSafe is one of the better choices you can make for antivirus software.

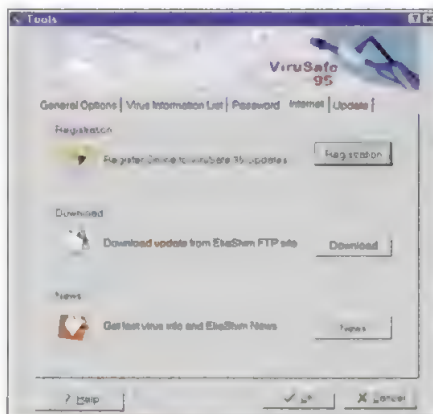
VirusSafe 95 2.1. List price: \$79. Requires: 486-based PC or better, 8MB RAM, 3MB hard disk space, Microsoft Windows 95 or later. EliaShim Inc., Pembroke Pines, FL; 800-477-5177, 954-450-9611; fax, 954-450-9612; www.eliashim.com. *Circle 511 on reader service card.*

McAfee Associates Inc.

VirusScan Deluxe for Windows 95

Innovative features such as virus-definition updates and configured scans constitute McAfee Associates' VirusScan Deluxe for Windows 95. McAfee includes versions of VirusScan Deluxe for Windows 3.x, DOS, and—in the CD versions—Windows NT and OS/2. McAfee also sells antivirus products for NetWare, Solaris, Macintosh, and Lotus Notes.

VirusScan Deluxe (\$60 street) uses code-tracing methods for detecting unknown viruses. Although the program performed well on the general scan test, its scans inside .ZIP files were very slow, with throughput that was a fraction of that of

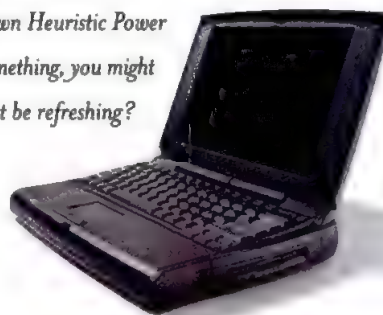


You can update VirusSafe's signature files from the Internet tab.



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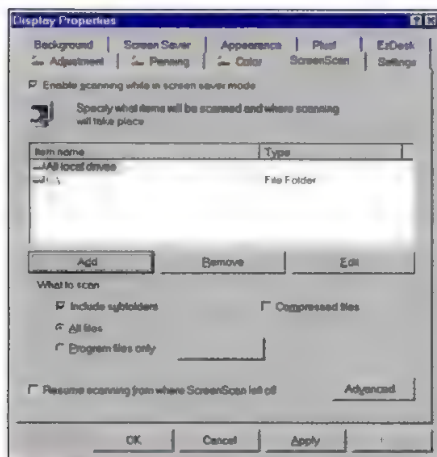
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Windows™ CE

any other program. VirusScan's best performance was on macro viruses; it repaired all 13 of them.

Besides a pleasant user interface, VirusScan Deluxe has the best strategy for making sure that your virus-definition files are up-to-date. An automatic update button prompts the program to log onto McAfee's computers over the Internet or BBS. It then automatically downloads and installs updated virus definitions. These updates are free for the life of the product.

On our tests, VirusScan Deluxe was the only product that checked for viruses during start-up of the scanner and loudly complained if the virus-definition files were six months out-of-date. From the dialog that appears, you can gain quick access to the automatic update procedure.

An innovative feature called ScreenScan can be configured it so that it scans in the background whenever your screen



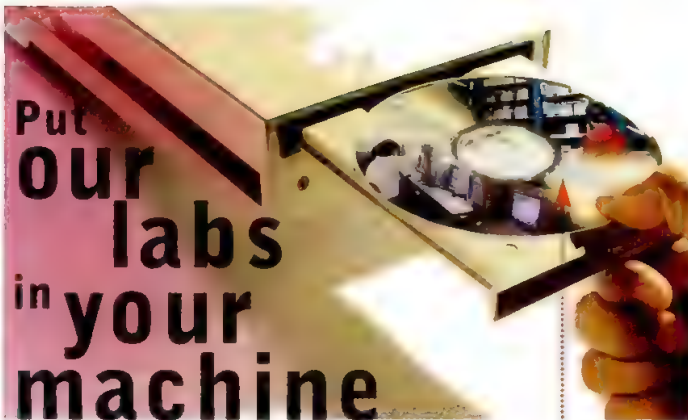
VirusScan Deluxe offers an innovative ScreenScan feature.

saver is activated. The scan will pause as soon as you resume working, then restart where it left off at the next opportunity.

A nondeluxe version of VirusScan, without the backup or the year of free program updates, costs \$49 (virus-definition updates are free with either version). All in all, VirusScan Deluxe is an attractive product that could use a bit of fine-tuning. □

VirusScan Deluxe for Windows 95. Street price: \$60. Requires: 486-based PC or better, 8MB RAM, 2.5MB hard disk space, Microsoft Windows 95 or later. McAfee Associates Inc., Santa Clara, CA; 800-332-9966, 408-988-3832; fax, 408-970-9727; www.mcafee.com. **Circle 512 on reader service card.**

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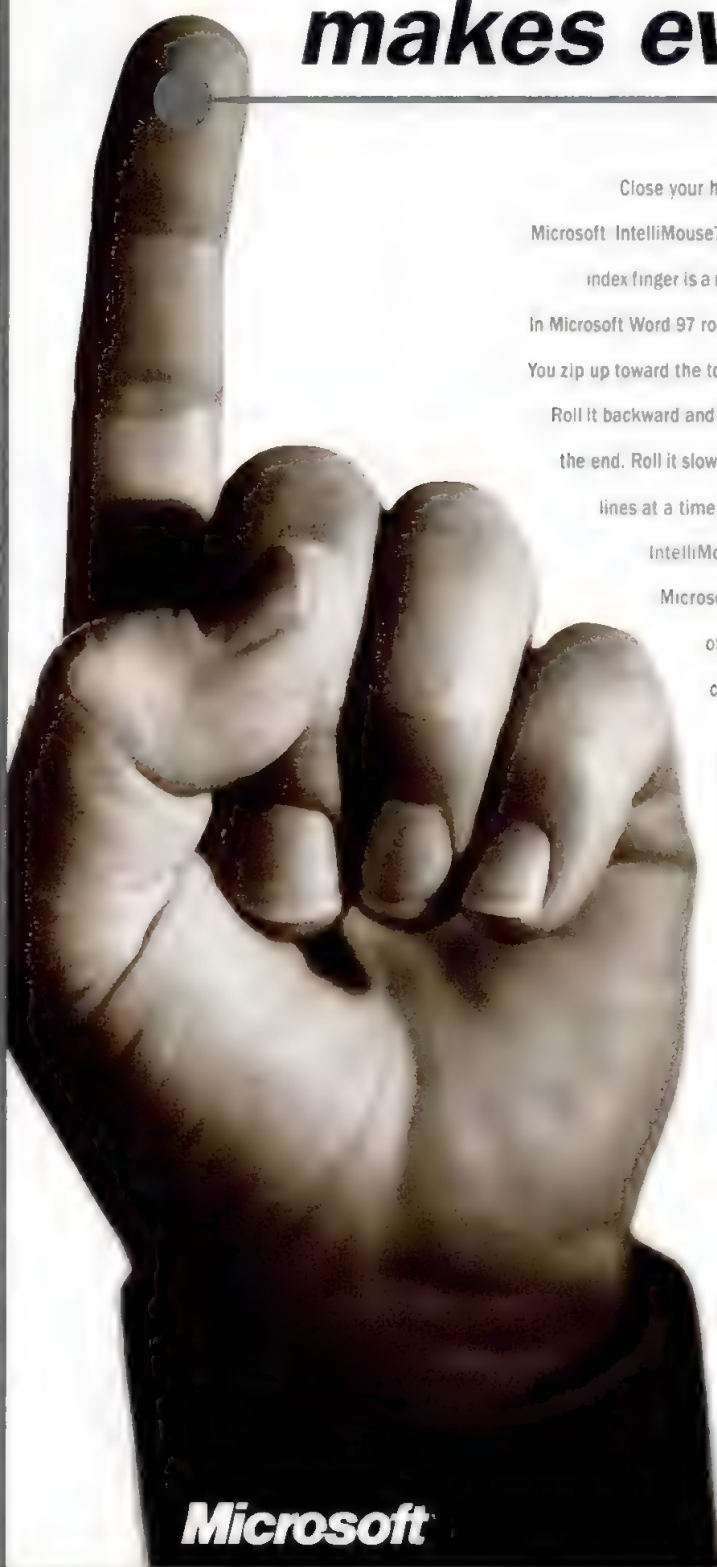
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Go to Microsoft Excel 97. Press the CTRL key and push the Wheel forward or backward. You zoom in closer or zoom out farther. See how manageable even a massive spreadsheet becomes.

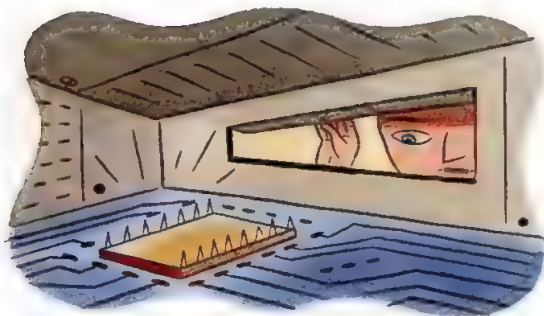
A final touch

To scroll through Web pages with Microsoft Internet Explorer, press the Wheel once and move the mouse downward. Your computer goes into AutoScroll mode. Automatically, rolling line by line through your entire document. Without even lifting a finger.



Microsoft

Microsoft
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DIAGNOSTIC utilities

Asking for help with your PC isn't as simple as asking for directions. These nine packages let you pinpoint problems, resolve conflicts, and get your PC in tip-top shape. *By Barry Simon*

Before Windows 95 came along, diagnostic utilities earned their keep mainly by reporting information needed to set dip switches (IRQs, DMA channels, and I/O ports) on new add-in boards, whose conflicts could send an otherwise solid machine into a tizzy. Windows 95's Device Manager and Add New Hardware wizard have eased hardware conflicts considerably, but Windows 95 has also created new software problems, helping to intensify the support role that diagnostic utilities play.

The new Windows 95 diagnostic utilities continue to fill in the gaps by providing system resources reports; uninstalling programs; clearing out duplicate files, orphan DLLs, and Registry entries; and even offering general advice. But Windows 95 has almost single-handedly necessitated a new class of diagnostic utility: software troubleshooters. Under Windows 95, we run multiple programs simultaneously and often mix 16- and 32-bit programs on our systems—all of which can spell fresh trouble.

For this section of our utilities blockbuster, we tested four packages that focus on hardware diagnosis, four that focus on software conflicts, and one that does both. Chances are no single product will satisfy all your troubleshooting needs for hardware and software, so plan on adding a couple to your arsenal.

REPORTING AND DIAGNOSTICS

Five of the diagnostic programs we tested—WINProbe 95, InfoSpy, PC Care, PC-Doctor for Windows, and WinCheckIt—are targeted at sophisticated users or at IS professionals responsible for multiple machines. Most also include modules for Registry and hard disk cleanup. A sixth product, Healthy PC for Windows 95, is marketed to the novice user and combines virus scanning (which none of the others offer) and other disk-scanning functions.

We tested on both a complicated desktop and a simpler portable. The first was a P150 with two hard disks, a SCSI controller, CD-ROM drives attached to both the SCSI and an IDE, and a sound card taking two IRQs. The second was a P100 with modem and network on a PC Card.

TUNEUP AND TROUBLESHOOTING

CyberMedia pioneered software troubleshooting with First Aid, and this year there are four such products: First Aid 97, Fix-It, PC Handyman for Windows 95, and WINProbe 95. In First Aid 95, crash protection was restricted to 16-bit applications and didn't work reliably. This year, all four products offer perfected crash protection modules. To test this feature, we ran 16- and 32-bit applications that generated a page fault, and we noted whether the utilities prevented an exit.



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First Aid 97 and PC Handyman also offer some level of crash recovery. When we ran a test program and invoked an infinite loop to cause a hang, both utilities successfully brought the program back to life. Crash protectors aren't the end-all, though. They can't prevent or reverse a Windows crash, and not every program can bounce back far enough to recover unsaved work.

Three diagnostic programs didn't meet our criterion of running under Windows 95, using instead a self-booting DOS disk that runs diagnostics directly on the hardware: AMIDiag (AMI; 800-828-9264, 770-246-8600; www.ami.com), CheckIt Diagnostic Kit (TouchStone Software Corp.; 800-531-0450, 714-969-7746; www.check-it.com), and PC Clinic (Data Depot; 800-767-3424, 813-446-3402; www.data-depo.com). There are also more narrowly focused utilities than those we reviewed, such as Agent 95 (Connectix; 800-839-3627; www.connectix.com), which concentrates on optimizing system memory.

CyberMedia Inc.

First Aid 97



CyberMedia pioneered software troubleshooting and conflict resolution with the original First Aid. So it's no wonder that First Aid 97 (\$40 street) makes a strong showing in this roundup. Its nonstandard yet elegant interface offers system tune-up, crash protection, and conflict resolution.

From the main screen, you can launch an easy, one-button checkup that tests your hard disk, the Windows system, the current

application, the network, multimedia performance, and printing. There are buttons that let you run more specialized versions of the tests, but there is no batch feature for setting up multiple test runs.

The underlying technology in First Aid 97's troubleshooting module is robust, and the module has a search-and-repair feature for corrupted Registry files. The program can also track and undo system file changes. In addition, it contains an excellent crash protection module. It

Editors' Choice

- Reporting and diagnostics: WINProbe 95
- Tune-up and troubleshooting: First Aid 97

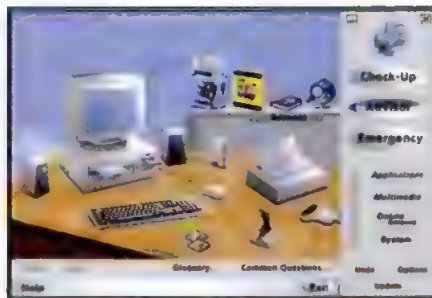


If you want to have a complete arsenal of diagnostic utilities,

you'll have to invest in more than one package. Of the products we tested that offer reporting and diagnostics, Quarterdeck Corp.'s WINProbe 95 (\$50 street) wins Editors' Choice hands-down. It delivers impressive reporting, good diagnostics and tune-up, and effective crash protection; our quibbles with the product were minor. AMI's PC Care (\$50 street)

gets an honorable mention for its superb diagnostics; we only wish its other modules measured up.

For system tune-ups and software troubleshooting, CyberMedia's First Aid 97 (\$40 street) wins Editors' Choice. Features that put it ahead of the pack include the identifying and fixing of corrupted Registry entries, the unfreezing of some applications, and a knowledge base covering over 1,000 applications. Quarterdeck's Fix-It (\$50) deserves honorable mention for a knowledge base spanning 900 applications and the ability to flag potential conflicts on program installation.



With a look all its own, First Aid 97 offers one-button access to system tests.

passed our 16- and 32-bit page fault tests and successfully unfroze a crashed application.

First Aid 97 also includes an advisor module, similar to the one in Symantec's PC Handyman but without a natural-language interface for typing

queries. Instead, it uses the same CBR (case-based reasoning) engine that PC Handyman does, licensed from Inference. The engine includes a series of questions about potential problems, and it suggests solutions when you ask those questions.

SUITABILITY TO TASK

Diagnostic Utilities

The nine packages that we reviewed tackle a range of diagnostic chores, although each product tends to be pretty narrowly focused in one or two areas. You'll need to invest in at least a couple to cover all bases.

Reporting To score well in this category, a product has to excel in the traditional areas of IRQ, DMA, and I/O port reporting. We also look for extras, such as a performance testing feature

and the ability to report on SCSI and PCI buses. In addition, we look for detailed information on Windows status and data structures.

SUITABILITY TO TASK

Product name

Reporting	Excellent
Diagnostics	Good
Tune-up and cleanup	Fair
Software troubleshooting	N/A

N/A—Not applicable. The product does not have the feature.

Diagnosis The highest-rated products test a system's video, memory, disk, modem, CD-ROM drive, sound, keyboard, and mouse. In addition, the depth of testing and the ability to set up repeatable scenarios are important.

Tune-up and cleanup A product should be able to clean out unused shortcuts and DLLs, orphaned Registry entries, and duplicate files. Performance tweaks and advice on running more smoothly are also factors.

Software troubleshooting We've tested the packages' ability to guard against crashes in other applications. Furthermore, we look for the ability to locate missing DLLs, to advise on conflicts between applications, and to correct shortcuts and Registry entries pointing to applications that have been moved.

The Support Tech's Desk Reference

By Barry Simon

Troubleshooting often involves such tasks as locating the switch setting on non-plug-and-play hardware or figuring out what AT commands a modem supports. Rather than digging through manuals (if you can still find them), take the approach that technical-support organizations adopted long ago: Rely on Micro House International (800-926-8299, 303-443-3388, www.microhouse.com), which provides a wealth of information on thousands of hard disks, motherboards, peripheral cards, and modems.

Micro House offers two comprehensive troubleshooting databases on CD-ROM: Support on Site for Hardware (\$995 for a one-year quarterly subscription) and Micro House Technical Library (\$595 for a one-year quarterly subscription or \$395 for a single issue). The databases include products manufactured as far back as ten years ago. They list pin and DIP switch settings, often with diagrams, and even many of the latest software drivers.

Support on Site for Hardware (as the more expensive product) adds complete manuals for thousands of

products, technical articles and newsletters, and many more drivers. Both of the products include handy directories of vendor phone numbers and addresses.

The growth of vendor Web sites has made such CD-ROM-based technical references somewhat less compelling. Still, not every company has a site, and those that do have such sites often support only the latest products there. Thus, these Micro House products' encyclopedic scope makes them a must-have for tech-support groups everywhere.

Our testing revealed one snag: When we tried to run our one-button test in the background, the program crashed. And one irritating problem was that the program often wouldn't reveal specifics of planned changes. Of course, it's a good idea to mask some technical details, but they should be available to users who want them.

The program's cleanup tests for linking orphan file types were thorough, but the interface could stand some improvement. For example, we had several .DB and .PX files that pointed to a deleted version of Paradox. Not only did First Aid insist on searching for the Paradox executable a number of times, but after each failure, it popped up a dialog box that required us to consent to the next search.

By contrast, when Quarterdeck's Fix-It does a similar search in batch mode, it presents all the failures at once.

Troubleshooting possible and actual software problems is a tough job. Although First Aid 97 occasionally stumbles or performs clunkily, on the whole it does a superb job of catching and fixing problems. It's an excellent choice for those who want cleanup and software troubleshooting, with a bit of hand-holding thrown in.

First Aid 97. Street price: \$40. CyberMedia Inc., Santa Monica, CA; 800-721-7824, 310-581-4700; www.cybermedia.com. Circle 441 on reader service card.

SUITABILITY TO TASK	
First Aid 97	
Reporting	N/A
Diagnosis	N/A
Tune-up and cleanup	Good
Software troubleshooting	Excellent

Quarterdeck Corp.

Fix-It, WINProbe 95

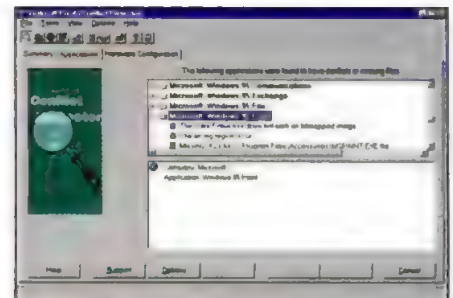


Last year, Fix-It (\$50 street) changed hands when Quarterdeck Corp. purchased VertiSoft; the box and the product's window still carry the VertiSoft name. Under any name this program is a top-notch cleanup tool and software troubleshooter, with lots of useful features and a smart interface. The Quarterdeck stable also gained WINProbe a short time before our roundup last year, when we found the interface garish and the modules often lacking in intuitiveness and error-prone. Quarterdeck has since used its expertise and design smarts in a total revamp. The result is WINProbe 95 (\$50 street), an accurate and comprehensive program for reporting and diagnosis.

From Fix-It's main screen, you can launch any of four modules that tune up, clean up, and resolve conflicts. There is also an effective crash-protection module that successfully passed our 16- and 32-bit page fault tests, though it lacks First Aid 97's and PC Handyman's ability to unfreeze.

Fix-It includes a module, Change Remover, that installs onto your Taskbar's notification area and tracks Registry changes as well as file changes that occur when you install a program. It also lets you undo Registry changes. In addition,

SUITABILITY TO TASK	
Fix-It	
Reporting	N/A
Diagnosis	N/A
Tune-up and cleanup	Excellent
Software troubleshooting	Good



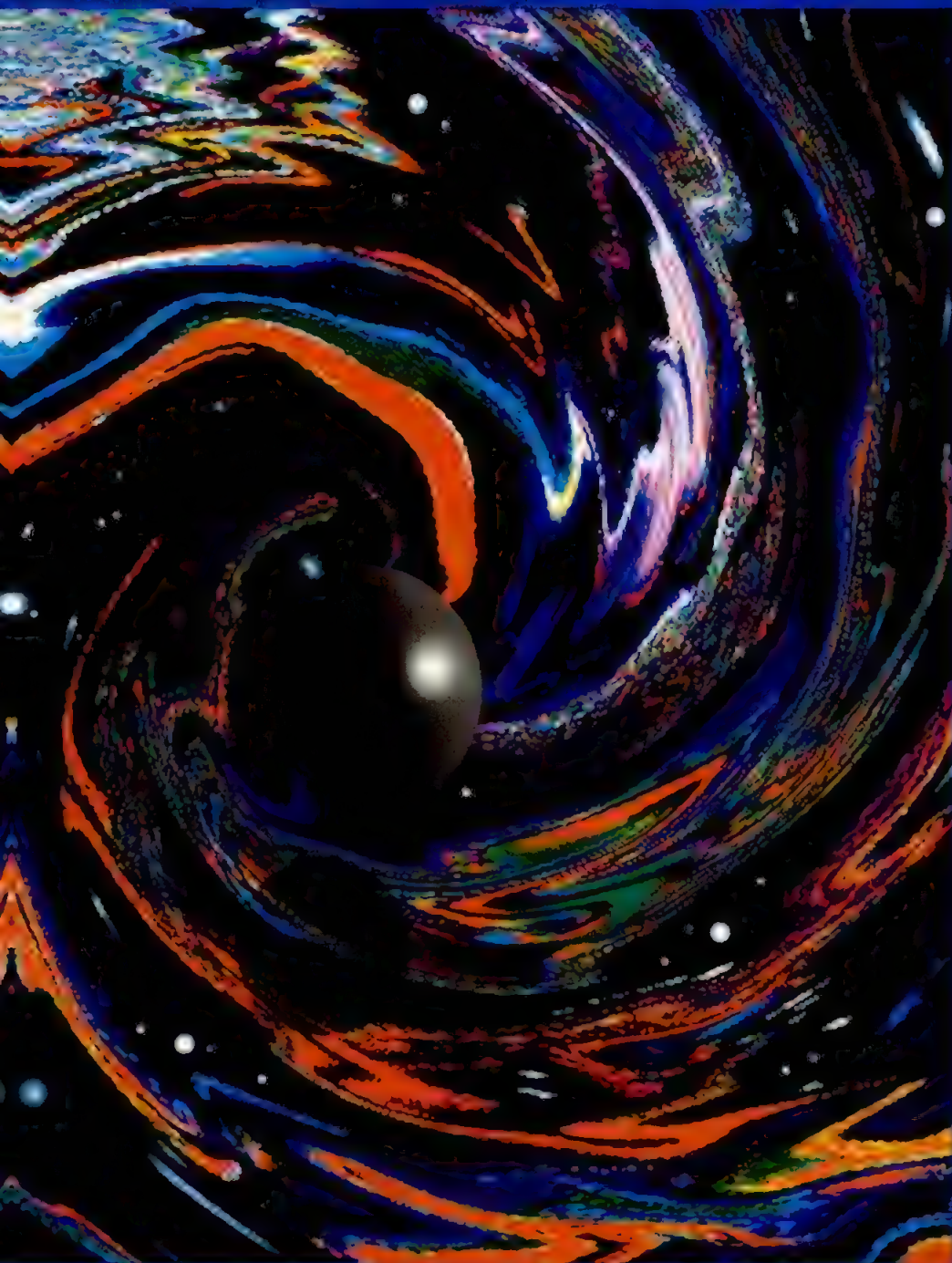
Fix-It's Conflict Detector displays a list of problem applications.

the package has a knowledge base that spans over 900 applications. Entering an application's name brings up a list of known problems, which the program offers to fix—as long as the solution involves changing an .INI file or Registry entry. The utility also uses the database to flag software conflicts on installation. But unlike First Aid 97, Fix-It cannot repair corrupted Registry entries.

The treatment of orphaned shortcuts illustrates the intelligence of the Fix-It interface. First, Fix-It searches your local drives (and not just the desktop and Start Menu) for the commands' correct locations. It outlines its intended changes and

lets you control which ones to implement. Finally, it presents a list of shortcuts it failed to fix and offers to delete them or to let you repair them manually. Our tests did turn up a minor glitch: The program failed to understand shortcut com-

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Diagnostic Utilities



WINProbe 95 offers a bit of everything: reporting, diagnostics, tune-up, and cleanup.

mands that used UNC (Universal Network Connection) network names.

A useful bonus is a directory of over 2,000 software and hardware technical-support contacts. Better yet, the help file's phone numbers and URLs are hot links: Clicking on a phone number activates the Windows 95 phone dialer, and selecting a URL launches the browser to that page.

If software conflicts are a concern, and if you want to keep your system clean and trim, Fix-It is an excellent solution.

WINProbe 95's reporting and diagnosis usefully complement Fix-It's troubleshooting. The reporting module offers the basics and made no errors in our testing, but it lacks advanced capabilities such as reporting on SCSI devices. It offers reports on currently running modules and some advanced Windows system information.

WINProbe 95's diagnostic capabilities are adequate but are less extensive than PC Care's; for example, the program lacks a batch mode for rerunning test sets. In testing, the diagnostics failed to find a modem on one of our systems, even after the reporting module had located it.

WINProbe 95 spans diagnostics categories by including a number of tune-up and cleanup functions. It offers useful tweaks, such as displaying a .BMP icon as a .BMP file thumbnail or not loading Drvspace on a system with compressed hard disks. Other high points include a module that trims dead Registry entries and a crash-protection module

SUITABILITY TO TASK	
WINProbe 95	
Reporting	Excellent
Diagnosis	Good
Tune-up and cleanup	Good
Software troubleshooting	Fair

that passed our 16- and 32-bit page fault tests (though it lacks an unfreeze feature).

There are a few weak spots. Although the program includes a Registry editor (Registry Guru), the feature is little better than the standard DOS Regedit. Also, our testing turned up some snags. WINProbe 95's knowledge base not only is weak but also contains errors; for example, the description of the Registry's HKEY_USER branch is inaccurate, and the knowledge base truncated text that we displayed with large fonts at 1,024-by-768 resolution. In addition, several reporting modules took so long to finish that we thought the system had crashed. A progress bar would be useful for such cases.

Despite these minor points, WINProbe 95 is one of the stronger entrants in the reporting and diagnostics category.

Fix-It. Street price: \$50. **WINProbe 95.** Street price: \$50. Quarterdeck Corp., Marina del Rey, CA; 800-354-3222, 310-309-3700; www.quarterdeck.com. *Circle 442 on reader service card.*

Symantec Corp.

Healthy PC for Windows 95, PC Handyman for Windows 95

Symantec Corp.'s Healthy PC for Windows 95 (\$30 street) takes a different approach to system diagnosis than this roundup's other utilities. Whereas they offer a range of features targeted at the intermediate user, Healthy PC is a low-level utility aimed squarely at the rank novice. PC Handyman for Windows 95 (\$50 street), a tune-up and software-troubleshooting utility, is also focused on the beginner. Its strong suit is crash protection; its other modules are adequate but are less thorough and informative than their counterparts in Fix-It and First Aid 97.

Healthy PC diagnoses viruses and problems in the logical disk structure. Although the product offers no reporting, tuning, or software troubleshooting, the interface couldn't be simpler to use. There are no options to set; one button click is all it takes to activate the full checkup.

The diagnostic runs through five tests: virus checking and removal and hard disk checkup, repair, and optimization. Healthy PC also provides access to monthly downloads of virus definition files from Symantec's Web site. The disk-



Healthy PC for Windows 95 makes system diagnostics the ultimate no-brainer.

checking module was a disappointment, however. It was unable to identify—let alone fix—any problems more complex than orphaned clusters. The program frequently directed us to a help file that suggested we purchase Norton Anti-Virus or Norton Utilities.

Healthy PC successfully repaired a file infected with the common Word Concept Macro virus, and it located and offered to delete a file infected with the Tequila virus. But the product made no attempt to repair boot sector infections, and it recommended, oddly enough, that we defragment a freshly defragmented disk with 0 percent fragmentation. Also, Healthy PC reported a disk error but was unable to fix it, suggesting we run Norton Utilities' Disk Doctor. Instead we ran Windows 95's ScanDisk, which found no error. At that point we ran Disk Doctor, which acknowledged and corrected the error.

Healthy PC's simple interface might make it popular with novice users who find ScanDisk difficult to fathom. But ScanDisk generally offers more accurate diagnostics, at no additional cost.

PC Handyman's crash protection comes in the form of Norton Crash Guard (also included in Norton Utilities). Crash Guard averted our 16- and 32-bit page fault tests, and its unfreeze feature can actually resuscitate a frozen application (though not a frozen OS). It also keeps track of offending applications and reports when and how often they crash.

The primary PC Handyman mod-

SUITABILITY TO TASK	
Healthy PC for Windows 95	
Reporting	N/A
Diagnosis	Poor
Tune-up and cleanup	N/A
Software troubleshooting	N/A

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PC Handyman for Windows 95's interface will put novices at ease.

ule differs from Crash Guard in being focused on beginners. The interface is cutesy, and it is built on the philosophy that novices prefer to avoid the details of their systems' inner workings. This approach is fine in theory, but it leaves more advanced (or even curious) users unable to determine which elements the program has checked. Indeed, if PC Handyman for Windows 95 finds nothing wrong in a given area, it doesn't report the good news.

Among the background tests it runs

SUITABILITY TO TASK	
PC Handyman for Windows 95	
Reporting	N/A
Diagnosis	Poor
Tune-up and cleanup	Fair
Software troubleshooting	Good

are the standard Norton Disk Doctor, Disk Doctor Surface Scan, a virus scan (though it does not remove viruses), and Registry Integrity Scan. The documentation

states that the latter feature removes invalid file associations, but our testing found plenty left behind on our systems.

The main PC Handyman window lets you input questions, and it uses natural language and employs the same CBR (case-based reasoning) engine as First Aid to interpret a query and present the right panel from its knowledge base. It also includes 140 .AVI video clips that address various tasks, such as deleting icons.

Its low-end focus and limited functionality limit PC Handyman's usefulness to truly novice users.

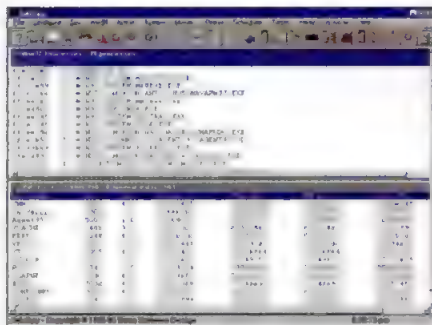
Healthy PC for Windows 95. Street price: \$30. **PC Handyman for Windows 95.** Street price: \$50. Symantec Corp., Cupertino, CA; 800-441-7234, 541-334-6054; www.symantec.com. *Circle 443 on reader service card.*

Dean Software Design

InfoSpy

Dean Software Design's InfoSpy (\$19.99 for the registered version) is a shareware tool geared toward programmers and tech-support departments. It reports esoteric technical information, such as active VxDs and the amount of various system resources a given application uses. The product is best suited for use as a supplement to the others we tested.

Among the reports the program generates is a list of all running tasks and all the DLLs on a drive. Highlighting a DLL and selecting the Command button produces a list of the .EXEs and DLLs that call it. The program can also rout out duplicate DLLs on multiple drives, and it



InfoSpy offers no-nonsense lists of active VxDs and DLLs.

can produce a list of icons in a DLL or .EXE file, which you can copy to the Clipboard or to a bitmap file. In addition, it includes a handy fax module for disseminating technical reports.

There's room for improvement, however. In testing, the program crashed when we tried to use the feature for finding duplicate files or the keyboard monitor option. And the interface could stand a makeover: It has nonstandard dialogs, less than intuitive menus, and unattractive and cryptic toolbar icons. There's no support for long filenames. Moreover, the utility would benefit greatly from a list box containing the display lists and employing a sorting feature, so that you

SUITABILITY TO TASK	
InfoSpy	
Reporting	Fair
Diagnosis	N/A
Tune-up and cleanup	N/A
Software troubleshooting	N/A

could display applications according to such characteristics as the amount of memory used.

Unless you eat VxDs and IRQs for breakfast, this pro-

gram won't appeal to you. But for those who consider themselves technical animals, InfoSpy provides information that is very difficult to find elsewhere.

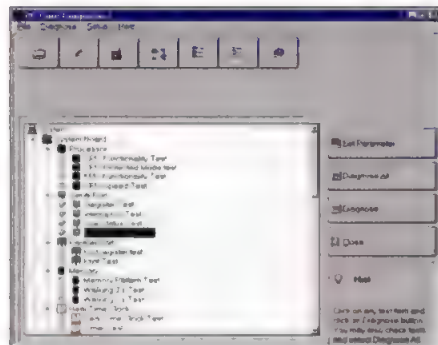
InfoSpy. List price: \$19.99 (shareware registration). Dean Software Design, Mill Creek, WA; 206-316-8645; ourworld.compuserve.com/homepages/deansoft. *Circle 444 on reader service card.*

American Megatrends Inc.

PC Care

PC Care (\$50 street) comes from American Megatrends Inc. (AMI)—the maker of the AMI BIOS, used in computers worldwide. Although the company has leveraged a unique expertise to create a powerful diagnostics tool with an above-average reporting module, a dangerous system-cleanup module mars the product.

Our testing proved the diagnostics to be impressive; PC Care checked not only the basics but also the PCI and USB bus. It provides multiple tests for most of the system objects it examines; for example, the serial-port tests included Register, In-



PC Care offers an array of tests, including ones for PCI and USB buses.

terrupt ID, Line Status, and Data Transfer. You can pick among various parameters to customize tests, to run them more than once, and to set up batch tests for multiple runs.

The reporting module, however, made a number of errors. It missed a sound card, a network IRQ, and several DMA assignments on our desktop system. And although it reported on advanced aspects, such as SCSI devices, it failed to report basics, such

SUITABILITY TO TASK	
PC Care	
Reporting	Good
Diagnosis	Excellent
Tune-up and cleanup	Poor
Software troubleshooting	N/A

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Diagnostic Utilities

as types of UART in the system.

The cleanup and tune-up modules didn't fare well. We found the orphan DLL module particularly ill conceived: It reported that some DLLs were not in use (and offered to delete them) when, in fact, the program simply did not require them until it loaded completely. In addition, the tune-up module was disappointing. It optimizes very few AUTOEXEC.BAT and SYSTEM.INI settings and all but ignores the Registry. But one strong feature here is the hardware tune-up module, which lets you check such issues as whether your CPU cache is properly turned on.

PC Care's feature set may be hit-or-miss, but if you need an industrial-strength diagnostics tool, none is better. For more general needs, WINProbe is the more suitable choice.

PC Care. Street price: \$50. American Megatrends Inc., Norcross, GA; 800-828-9264, 770-246-8600; www.ami.com. **Circle 445 on reader service card.**

Watergate Software Inc.

PC-Doctor for Windows

Watergate Software's PC-Doctor for Windows (\$100 street) does an adequate job of reporting and diagnosing system problems. But its lofty price tag and lack of any tune-up or software-troubleshooting features put it behind its competitors on the price/performance continuum.

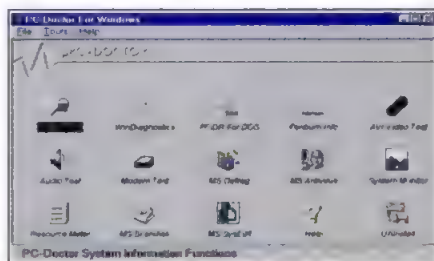
The interface's main window acts as a launch pad for the modules and includes icons for Windows system utilities, such as ScanDisk and Defrag. The program contains a reporting module, Windows- and DOS-based diagnostic modules, and specialized Pentium, .AVI file, audio, and modem tests.

On our test machines, the reporting module correctly identified all of the IRQs and DMA channels. And PC-Doctor's detailed report on Pentium performance is unique among the products we reviewed. For instance, it reported that over 90 percent of the CPU's read and write requests concerned data in the CPU cache. But the program failed to find any PC Card facilities on our test portable

(which had a PC Card installed), and it reported the compressed drive and its host as separate drives.

PC-Doctor's Windows-based diagnostics comprise three categories of interactive tests that span CPU, drives, memory, and video. The program lets you pick tests and save the selections for reuse, but it lacks a batch mode for multiple passes.

You might expect the DOS diagnostics to allow more thorough testing, because Windows filters out and even changes some information. But we were unable to run many of the tests, because the DOS module relies on real-mode drivers that Windows doesn't load, such as drivers for



PC-Doctor for Windows' launch pad is home to reporting and diagnostic modules.

network and SCSI ASPI services.

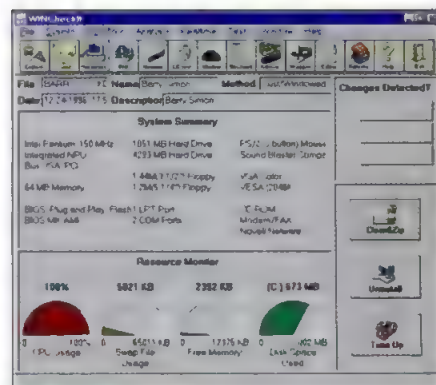
Top reporting and diagnostics products (such as WINProbe 95 and PC Care) offer more extensive testing, as well as tune-up and troubleshooting. All in all, PC-Doctor doesn't offer much bang for the buck.

PC-Doctor for Windows. Street price: \$100. Watergate Software Inc., Emeryville, CA; 510-596-2080; www.ws.com. **Circle 446 on reader service card.**

TouchStone Software Corp.

WinCheckIt

While Quarterdeck and AMI have vastly improved their diagnostic and reporting offerings and Symantec has entered the fray with Healthy PC, TouchStone Software Corp. hasn't introduced a new version of WinCheckIt (\$50 street) since October 1995. The program built its reputation on a strong reporting module, but the advent of Windows 95 (which contains its own reporting features) has substantially weakened WinCheckIt's position. And in areas where it might have gained a following, tune-up and software trouble-



WinCheckIt contains a handy module for locating orphan icons and shortcuts.

shooting, the modules prove limited. TouchStone plans to release an overhauled version later in the year.

Capable of operating in either Windows or DOS mode, WinCheckIt's reporting module did well on our tests, but not exceptionally well. It located the basic hardware and reported all the IRQs on our machines correctly, but it stumbled on DMA settings—missing three out of five on the desktop system and one of three on the portable.

This module's most useful component locates orphan icons and desktop and Start Menu shortcuts that don't point to valid entries. One flaw is that WinCheckIt deems invalid any shortcut with too long a pathname, but as long as you double-check that items are truly invalid, the reports are useful for pruning deadwood.

Less extensive than WinCheckIt's reporting module, the diagnostics include tests for the motherboard (including CPU), ports, disks, and modem, but not for memory or video. The uninstall module cannot track installs but does a fair job of removing old files.

Some once-useful modules are showing their age. For example, Shopping Advisor gives a baud rate of 9,600 bps for the U.S. Robotics Sportster modem, even though there are now 14.4-, 28.8-, and

33.6-Kbps models. Our advice: Wait for the updated release. **WinCheckIt.** Street price: \$50. TouchStone Software Corp., Huntington Beach, CA; 800-531-0450, 714-969-7746; www.checkit.com. **Circle 447 on reader service card.**

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CIRCLE 303 ON READER SERVICE CARD

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A black and white photograph of a man, Mike Latschislaw, sitting in a chair. He is wearing a light-colored jacket over a dark shirt. On top of his head is a computer monitor displaying a colorful, abstract image. The background is a wall made of large, square tiles.

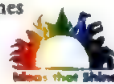
**Mike
Latschislaw
finally found
a monitor
as good as
the games
he designs.**

Over at the JVC games division they look to Mike Latschislaw to make their games come alive. But while he's doing it, Mike looks to something else. The new 17PX monitor from Hansol.

Because according to Mike, no other monitor sets up as easily, has as many controls (20 on-screen settings), is as practical to use, and with its radical, modern design, is just such a pleasure to look at.

So next time you've got a game on the screen, think of the guy who designs them. Then think of the monitor he uses. The new 17PX from Hansol.

Because when it comes to monitors, Mike doesn't play games.



Hansol

For further information, call toll-free
1-888-HANSOL1(1-888-426-7651).

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CIRCLE 113 ON READER SERVICE CARD

The simpler server.

The New IBM AS/400 Advanced Entry

If you're ready to move your business up to a server, the choice is simple: the new IBM AS/400 Advanced Entry. Prices start as low as \$7,995. An incredible value, considering AS/400 Entry is actually five servers in one: an Internet, database, application, print and network server.

Connecting to your PCs is a snap, and the high-performance 64-bit RISC processor lets you unleash the power and speed of your 32-bit PC workstations. Also available is an onboard Intel Pentium processor that runs your existing Novell NetWare PC applications, protecting your software investment.

But you won't have to make a trade-off between increased function and ease of use. The newest member of AS/400 Advanced Series, AS/400 Entry is among the

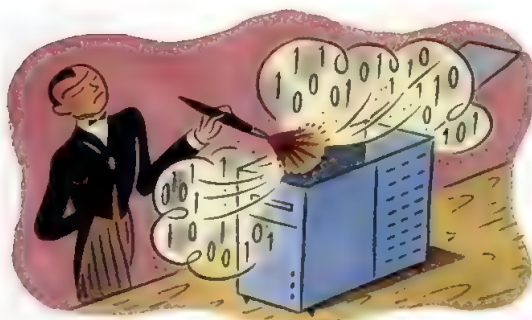
easiest servers to install, use and maintain. And AS/400 has the lowest cost of use for small businesses over a five-year period, compared to leading LAN server platforms.*

Add to that unparalleled reliability, virtually maintenance-free operation, and built-in security features and you can see why, when you bet your business on your server, your best bet is AS/400 Entry.

How can the new AS/400 Entry simplify your business? To find out more, drop by www.as400.ibm.com/as4server, or call 1 800 IBM-2468, ext. BA001, and ask about our affordable financing.

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UNINSTALL utilities

A hard disk can be a messy place. But these Windows uninstall utilities can help you clean house safely without damaging your system. *By Edward Mendelson*

If your hard disk needs a spring cleaning, you'll need a professional disk cleaner to get the job done right. Uninstall utilities are the professional cleaning staff for your Windows 95 and Windows NT housekeeping.

Windows applications litter your disk with files that take up space and serve no purpose. Every time you load a program on your hard disk, you end up with more files than you ever wanted. In the DOS era, you could generally remove all traces of an unwanted program simply by deleting every file in its directory. In the era of Windows, if you simply remove a program's directory you leave behind DLLs (dynamic link libraries) and other files that the program installed in the Windows directory. You also leave behind masses of useless data that clog up the Windows Registry. In some cases, you may cause Windows to issue error messages or behave unreliably the next time you boot up.

Uninstall utilities are designed to remove every trace of an application from your disk. They also remove miscellaneous files that you never needed or no longer have any use for. The best uninstall utilities are safe, fast, and thorough. If an uninstall utility removes files that are needed by Windows or by another application, it can wreak havoc with your system. If it leaves behind too many files, it probably won't do any harm, but

you'll be left with a cluttered disk. Also, your system may be left with programs running invisibly in the background but performing no function.

Today's uninstall utilities perform many chores. All of them can monitor an installation so that they know exactly which files were added to your system, and all can intelligently guess which files they can safely remove. All can remove programs that they did not monitor during installation, although they generally remove them less thoroughly than those they monitored. Most let you back up the programs they remove, so you can restore them if you change your mind.

Uninstall utilities also offer to clean out unneeded files in a wide range of categories: unused DLL and .INI files, the contents of your Web browser's disk cache, forgotten Netscape Navigator plug-ins. Most of these utilities also offer to clean out unneeded entries from the Windows Registry. One relatively safe feature in these programs is the ability to move applications. But other functions are inherently dangerous and should probably be used only by experts—and only when the utility being employed makes a backup.

All serious Windows users need uninstall utilities for cleaning their hard disks and their Windows setups. But whichever product you choose, use it with care.



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Uninstall Utilities

Quarterdeck Corp.

CleanSweep

With a robust feature set and polished interface, Quarterdeck's CleanSweep, Version 3.0, is a mature and reliable product. But on our tests, we found CleanSweep to be a little too aggressive at times, and the program is best suited for those who know their way around Windows.

The latest version of CleanSweep (\$40 street) offers unobtrusive background monitoring of installations and thorough and reversible uninstallations of any application or folder, whether or not it monitored the original installation. In addition to its wizard-driven uninstall module, CleanSweep includes file cleanup modules that range from an intelligent Registry editor with a search-and-replace feature to file finders that weed out redundant and duplicate files. The program effectively moves files between drives and—if you have a copy of the program on both systems—between two separate computers.

A new SafetySweep feature prevents you from deleting necessary files. But while the program's dialogs and manuals lead you to believe that SafetySweep will block deletion of any files marked in yellow, the feature works only in the miscellaneous file-cleanup modules, not in the uninstall module. This could lead to confusion or even the loss of critical files.

CleanSweep's scan is one of the fastest among the uninstall programs. And the background installation monitor that CleanSweep adds to your startup group is the best and least obtrusive among the uninstall utilities we tested. But options for cleaning up miscellaneous files aren't as extensive as those in UnInstaller 4, and

CleanSweep won't specifically empty out browser cache files. Another minor flaw is the program's inability to move the DLLs that it tells you should be moved. Quarterdeck will fix this with a patch file on its Web site. Overall, CleanSweep remains a powerful uninstall package, but you may be better off with a more conservative program. **CleanSweep 3.0.** Street price: \$40. Requires: 486-based PC or better; 8MB RAM (16 for Windows NT), 10MB hard disk space; Microsoft Windows 3.1, Windows 95, or Windows NT. Quarterdeck Corp., Marina del Rey, CA; 800-683-6696; fax, 800-354-3329; www.quarterdeck.com. Circle 519 on reader service card.

Alpha Software Publishing, a division of SoftQuad Corp.

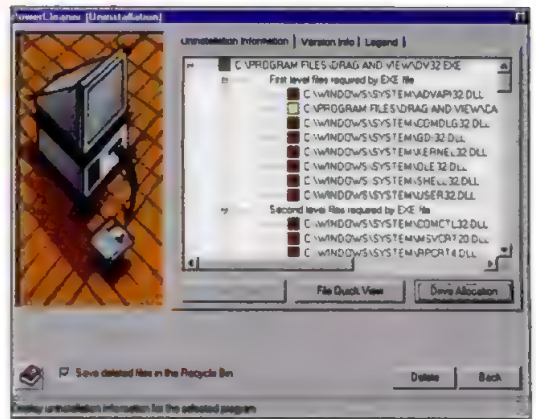
PowerCleaner

Someday, Alpha Software Publishing's PowerCleaner (\$30 street) may live up to its name, but Version 1.5 lacks the power and safety measures necessary for the precarious task of cleaning your hard disk.

PowerCleaner's main strength is its two-level search for removable files. It finds not only the DLL files used by an application but additional support files used by the DLL files. But this strength is offset by the program's many weaknesses. PowerCleaner cannot fully reverse an uninstallation, and it suffers from confusing dialog boxes and messages. Even on our 200-MHz Pentium Pro test-bed, performance was unacceptably slow.

PowerCleaner's features are divided into standard functions (installation monitoring and uninstalling) and advanced functions (program relocation, archiving, and Windows cleanup). When you uninstall an application or a folder of applications, PowerCleaner suggests that you use two or more uninstallation methods: First try the application's own uninstallation routine, then switch to PowerCleaner's uninstallation routine to find anything left over.

Amazingly, PowerCleaner's native uninstallation process does not provide an option to create a backup of



PowerCleaner's only backup option is a check box that saves files to the Recycle Bin.

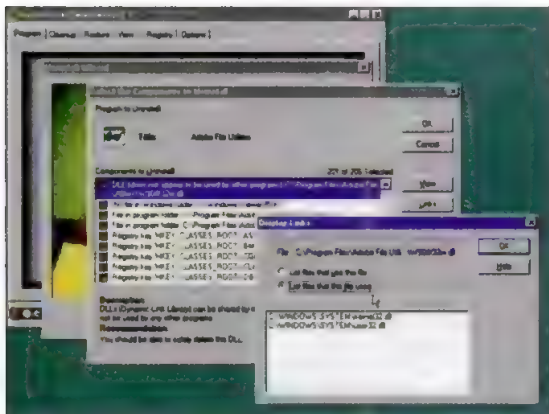
the removed application and its associated files. A check box gives you the option of saving removed files to the Windows Recycle Bin, where you can retrieve them if you encounter a problem. But the program doesn't back up the application's Registry entries or .INI file entries, and you have only a limited chance of restoring the application to full working order.

Many of PowerCleaner's options are merely front ends to built-in Windows features such as REGEDIT. In addition, PowerCleaner's file lists display only short filenames. It scans applications slowly for links, and you can't cancel a scan. PowerCleaner's inability to reverse an uninstallation makes it a dangerous product for experts and beginners alike. **PowerCleaner 1.5.** Street price: \$30. Requires: 486-based PC or better, 16MB RAM, 15MB hard disk space, Microsoft Windows 95. Alpha Software Publishing, a division of SoftQuad Corp., Burlington MA; 800-451-1018, 617-229-2924; fax, 800-952-8363; www.alphasoftware.com. Circle 520 on reader service card.

Quarterdeck Corp.

Remove-It

Quarterdeck is in the odd position of marketing two competing uninstall utilities. Remove-It 3.0 (\$40 street), which it acquired from Vertisoft, can't match CleanSweep's elegance and speed. But unlike CleanSweep, Remove-It can archive applications into self-installing files, so you can transfer applications to a computer that doesn't have Remove-It installed. Remove-It's other features generally match those of CleanSweep, but its



CleanSweep's file list includes an option to view each file and its dependencies.

Editors' Choice

• UnInstaller 4



In the world of Microsoft Windows 95, getting files off of your system is a lot harder than installing them. The

right uninstall utility must strike a careful balance between power and safety in order to keep your hard disk tidy without obliterating essential files. No one product we tested is perfectly suited to all types of users, but MicroHelp's UnInstaller 4 comes closest.

With an emphasis on safety, UnInstaller does everything short of preventing you from running with scissors. This Windows 95 and Windows NT program makes it extremely difficult to delete important Windows files. We even tried to trick UnInstaller by creating a custom group of files—including some critical Windows files—to uninstall, but the program refused to delete them.

UnInstaller has a wizard-based interface for simple operation, automatically creates backups, and can restore any removed files. In the Uninstall module, files are marked with green, yellow, or red to indicate whether or not they can be safely removed. The program has a larger database of crucial Windows files than its competitors do; these are marked with a red slash,

and UnInstaller won't let you delete them, even if you change the program's settings.

UnInstaller's file cleanup module does identify a number of file types that you can safely remove, including your browser's disk cache. We were especially impressed with two features. First, you can tell UnInstaller how much hard disk space you need, and the program will automatically recommend files to delete in order to make room. Second, you can create custom groups of files to be removed by using specific parameters—for example, only files that were modified between certain dates. One caveat: UnInstaller's scanner was slow on our tests. MicroHelp plans to offer a free upgrade on its Web site that should correct the problem.

One other product, CleanSweep, deserves honorable mention for its well-rounded feature set and strong interface design. Like UnInstaller, CleanSweep has a straightforward wizard-based uninstall module. Its scanner is considerably faster than Un-

Installer's, and it comes with a powerful Registry editor that includes a search-and-replace function as well as a thorough system cleanup tool and a tool for finding duplicate files. Our only reservation with CleanSweep is that users could accidentally remove files they need. The biggest problem is with SafetySweep, a new feature designed to prevent deletion of files marked with yellow caution lights. Unfortunately, SafetySweep only works with the file finder and cleanup functions, not the uninstall component—a fact not noted in the program dialogs or documentation.



interface is tailored to nonexpert users.

Remove-It compiles a database of file links when you first install it, and it updates the database quickly each time you launch it. A background installation monitor pops up whenever you install a new application, and it records all changes to your hard disk

form an Express removal, which uninstalls applications or whole folders with a minimum of prompting, or a Custom removal, which lets you remove or retain individual items. The program tells you which keys it will remove from the Registry, but in some cases it combines all the Registry entries it proposes to remove into a single item.

A Cleanup Coach guides you through the process of removing unneeded and duplicate files. Many of these files are marked with yellow caution signs, and you can't set an option (like CleanSweep's SafetySweep) that makes it impossible to remove these files—some of which are essential to printing, faxing, dialing, and other Windows functions. To see the

version numbers of the files, you have to click on a View button.

The Clean-It module does an effective and generally cautious job of removing unneeded Registry entries; an .INI file editor lets you modify and remove individual lines but won't let you add anything. Overall, Remove-It is a capable but unre-

markable program. Its only true ace in the hole is its ability to create self-installing archives.

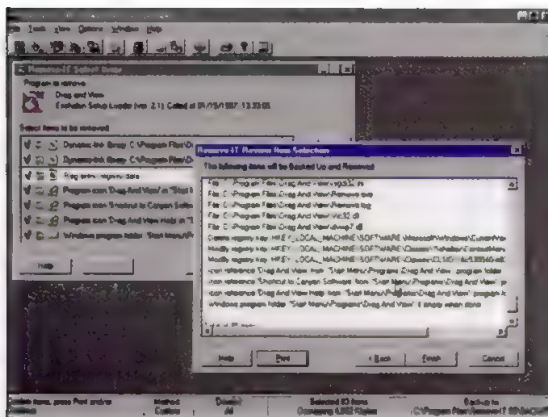
Remove-It 3.0. Street price: \$40. Requires: 386-based PC or better, 8MB RAM, 4MB hard disk space, Microsoft Windows 95. Quarterdeck Corp., Marina del Rey, CA; 800-683-6696; fax, 813-523-2391; www.quarterdeck.com. **Circle 521 on reader service card.**

MicroHelp Inc.
UnInstaller 4



MicroHelp created the uninstall category. UnInstaller 4 (\$35 street) upholds the program's long-standing reputation for safety, power, and simplicity. UnInstaller's main focus is safety; its database recognizes crucial Windows system files and prevents you from deleting them.

This Windows 95 or Windows NT 4.0 program removes or archives applications, transports them to other drives or other computers, cleans up the Windows Registry, and roots out a vast variety of unneeded files (including those in your browser's disk cache).

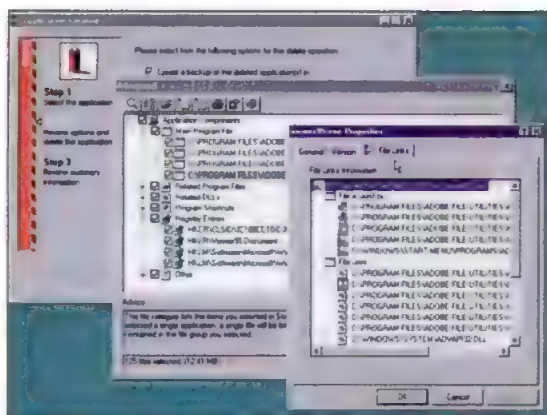


Remove-It displays details of the files it proposes to remove.

and Windows Registry so you can remove the application thoroughly.

You can undo all file removals at any time as long as you create compressed backups. With Remove-It, you can per-

Uninstall Utilities



UnInstaller's advanced dialog box lists everything to be removed.

When you first install UnInstaller, it scans your hard disk and Windows system for file links. It then checks its database every time you launch it, and a background installation monitor tracks any changes made to your system. If you remove an application not monitored by UnInstaller, the program does a thorough job of finding removable files but doesn't try as hard to root out Registry entries. An ingenious feature lets you specify the amount of disk space you want to free up and then recommends files for deletion.

An uninstall module archives applications, moves applications between drives, and creates self-installing files that you can transport to other computers. A separate File Cleanup lists backup, multimedia, and other discardable files, together with a very conservative list of orphan entries in the Windows Registry and duplicate files.

Unless you change a default option, UnInstaller lists only duplicate files that

are exact matches. Unlike more aggressive file-removers such as CleanSweep and Remove-It, UnInstaller makes no attempt at all to find unused DLLs, because many so-called "unused" files are in fact used by Windows.

UnInstaller's Achilles' heel is performance. It tended to be slower than other uninstall programs, but a free fix should be available from MicroHelp's Web site by the time you read

this. In the meantime, if you don't mind trading a little time for extra peace of mind, you'll find UnInstaller the ideal house cleaner for your overstuffed system.

UnInstaller 4. Street price: \$35. Requires: 486-based PC or faster, 8MB RAM, 8MB hard disk space, Microsoft Windows 95, Windows NT 4.0, or later. MicroHelp Inc., Marietta, GA; 800-922-3383, 770-516-0899; fax, 770-516-1099; www.microhelp.com. Circle 522 on reader service card.

IMSI

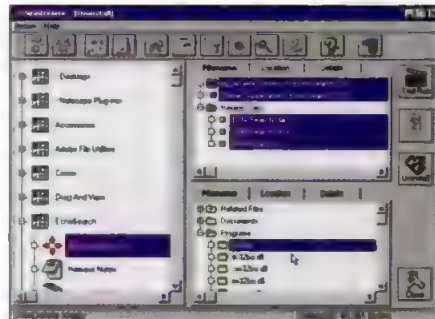
WinDelete 3.0

Though WinDelete 3.0 (\$30 street) doesn't claim to clean out every last corner of your Windows 95 system, it does an effective job removing programs later on if you let it track all the software you install on your system. This uninstall package from IMSI includes modules that monitor installations, remove applications and Netscape Navigator plugins, identify duplicate files, move applications from one folder to another on the same machine, and perform some

basic fine-tuning of your system.

More for beginners than experts, WinDelete emphasizes safety rather than efficiency. It doesn't remove any files you're likely to need, and it doesn't include tools such as Registry editors. It lets you restore any application it removes, and its duplicate-file finder only lists document and image files.

You can track an installation by launching the setup program from the Install module, or you can use a unique fea-



WinDelete separates potentially important files from those that can be safely deleted.

ture that conveniently adds an Install with WinDelete check box to the Start menu's Run box and to the Add/Remove Programs applet in the Windows Control Panel. When WinDelete tracks an installation, it takes before-and-after "snapshots" of your system. As a result, if you reinstall a program over a previous installation, WinDelete will not detect that anything has happened, and it won't remove anything if you later attempt to uninstall using the installation log.

WinDelete ran smoothly on a 1GB system, but on a test machine with 2GB of files, the program closed itself without warning in the middle of some of its pre-uninstallation system scans. A patch from the company's Web site failed to resolve the program's difficulties. The CD-ROM also includes McAfee's VirusScan, a system checker, and a file manager program. WinDelete won't impress Windows experts, but first-time computer users won't find a safer choice. □

WinDelete 3.0. Street price: \$30. Requires: 386-based PC or better, 8MB RAM, 3MB hard disk space, Microsoft Windows 3.1 or Windows 95. IMSI, San Rafael, CA; 800-833-8082, 415-257-3000; fax, 415-257-3565; www.imsoft.com. Circle 523 on reader service card.

SUMMARY OF FEATURES

Uninstall Utilities

■ YES ■ NO

Products listed in alphabetical order

	CleanSweep 3.0	PowerCleaner 1.5	Remove-It 3.0	Uninstaller 4	WinDelete 3.0
Street price	\$40	\$30	\$40	\$35	\$30
Background installation tracking	■	■	■	■	■
Installation tracking on command	■	■	■	■	■
Backs up removed files	■	■	■	■	■
Moves applications between drives	■	■	■	■	■
Moves applications between PCs	■	■	■	■	■
Creates self-installing files	■	■	■	■	■
Finds duplicate files	■	■	■	■	■
Fully edits .INI files	■	■	■	■	■
Prompts to remove backup files	■	■	■	■	■
Removes invalid Registry entries	■	■	■	■	■

PC MAGAZINE
EDITOR'S CHOICE

THE DAKOTA KEYKEEPER

TRUSTWORTHY · HONEST · BRAVE



GATEWAY2000

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HE HOLDS THE KEYS

Deep in the Dakota prairie, a small town prepares for another Midwest winter. The townsfolk begin their annual migration to warmer climates. They leave behind the hardest, bravest, most reliable among them. This traditional hero of the plains is known as the "Keykeeper," and is entrusted with their most valued possessions.

It's a lonely job. But the keykeeper holds the keys to the freshest technology from Gateway 2000. Our legendary keykeeper is also a high-end computer aficionado who knows GATEWAY™ PCs are the key to all his computing needs. They take him farther, faster than any of the townspeople will travel.

The keykeeper basks in the blazing 32-bit performance of the Intel Pentium® Pro processor in his new look G6-200XL multimedia PC. Gateway's new cases brighten the gloomiest day. And now most desktop systems Gateway builds come with this innovative design. The new case and color-coded cables provide easier access and setup. Plus the 12X min/16X max CD-ROM drive delivers unprecedented throughput speed for amazing multimedia! Soon it will be time to challenge the elements and make his first round through the town, ensuring all is well and in its rightful place. For now he revels in the technology.





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UNLOCK THE POWER

He forges a path through the raging blizzard. Waiting in the post office is a Gateway Solo™ 2200 portable PC, a force more powerful than the winter storm outside. Next to it is a high-performance G6-200 Pentium® Pro processor-based professional PC. Both systems can be custom configured and are loaded with great features. Microsoft® Office 97 Small Business Edition plus Encarta® 97 software is tailored to the needs of home and office. Keeping the post office organized is not only going to be easy, it's going to be fun. MS® Office 97 Small Business Edition plus Encarta 97 includes MS Word 97, Excel 97, Publisher 97, Automap® Streets and Outlook™ 97. The keykeeper could play post office all day, but duty calls.





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OPEN NEW DOORS

He saved the schoolhouse for last. Here select systems from Gateway's entire product line tout the new Intel Pentium® processor with MMX™ technology — from Family PC™ systems to professional computers to Gateway Solo™ portables. Of course the Destination™ Big Screen PC line also includes MMX technology as an option. This group-computing PC and TV combination delivers the latest and greatest, and now some configurations include the EasyPhoto Drive™ scanner, too.

The keykeeper dives into the exceptional performance of Intel's next-generation Pentium processor with MMX technology. The extra L1 cache on the Pentium processor with MMX pays off instantly with an increase in raw horsepower. No wonder the February '97 *PC World* declared the custom-configured Gateway PC with a 200MHz Pentium processor with MMX, 4MB video card, 3.8GB hard drive, and Altec™ Lansing ACS 410 speaker system **"the fastest machine we have ever tested."** And *PC Magazine* gave it the **Editors' Choice Award** in the February 4 issue.

With the introduction of a 166MHz Pentium processor with MMX in the Gateway Solo 2200 portable line, he gets performance that compares to similarly configured Pentium processor-based desktops. The Dakotas have never been a place for the faint of heart, and now the Pentium processor with MMX technology makes it even more of an adventure.

Gateway holds the keys to *your* computer needs. Call us today.



Destination™ Big Screen PCs

D5-166

- Intel® 166MHz Pentium® Processor with MMX™ Technology
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- STB® 2MB VRAM Graphics Accelerator w/ Cable-Ready TV Tuner
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- Wireless Field Mouse® Remote
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- Microsoft® Windows® 95
- Destination Software Collection
- MMX Technology-Enhanced Software Bundle**
- Gateway Gold™ Service and Support* for Big Screen PCs

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- Intel 200MHz Pentium Processor with MMX Technology
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- Destination 31" VGA Monitor
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- 2.5GB 11ms EIDE Hard Drive
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- 16-Bit Ensoniq Wavetable Sound Card
- ▶ harman/kardon® High-Fidelity Sound System
- TelePath 33.6 Data/14.4 Fax Modem
- 7-Bay Charcoal-Colored PC Case
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- Zoomed Video Port
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- Modular 8X CD-ROM Drive
- Modular 3.5" Diskette Drive
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- MS Windows 95
- MS Works 95
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- Carrying Case
- MS Windows 95
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- 2MB EDO Video RAM
- Zoomed Video Port
- NTSC/PAL Video Output
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- Modular 8X CD-ROM Drive
- Modular 3.5" Diskette Drive
- 16-Bit Wavetable Sound & Stereo Speakers
- Lithium Ion Battery & AC Pack
- 85-Key MS Windows 95 Keyboard
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- MS Windows 95
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2200 S5-166

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- Intel 166MHz Pentium Processor with MMX Technology
- 80MB EDO DRAM
- 256K Pipelined Burst Cache
- 2MB EDO Video RAM
- Zoomed Video Port
- NTSC/PAL Video Output
- 2GB Hard Drive
- Modular 8X CD-ROM Drive
- Modular 3.5" Diskette Drive
- 16-Bit Wavetable Sound & Stereo Speakers
- 33.6 PCMCIA Data/14.4 Fax Modem
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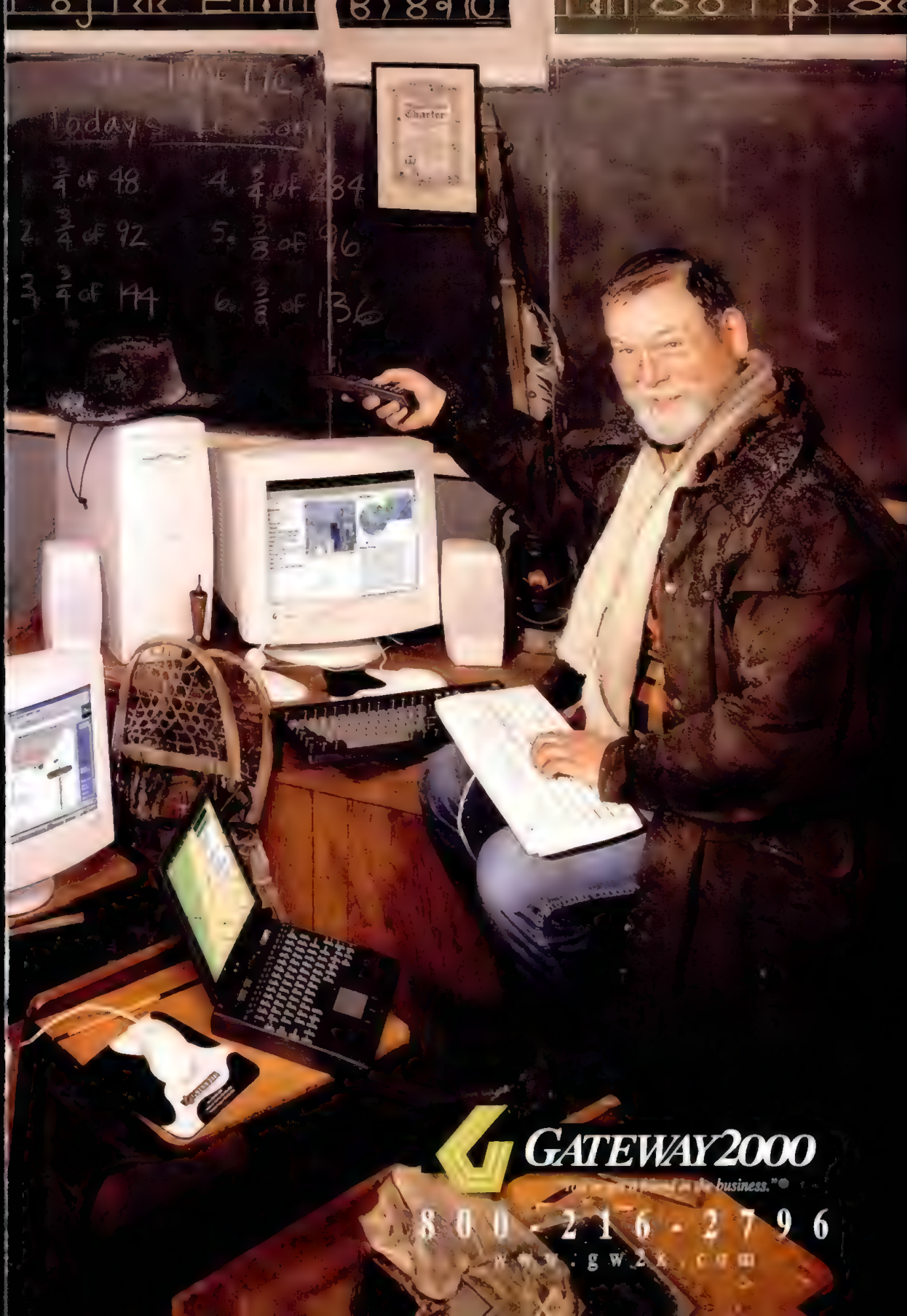
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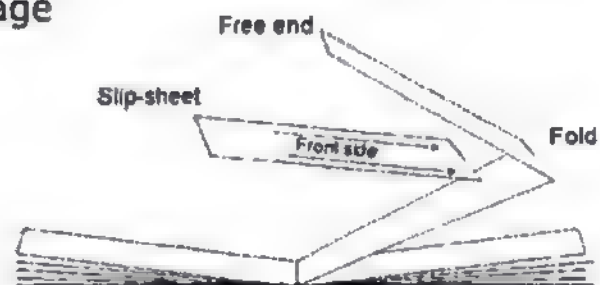
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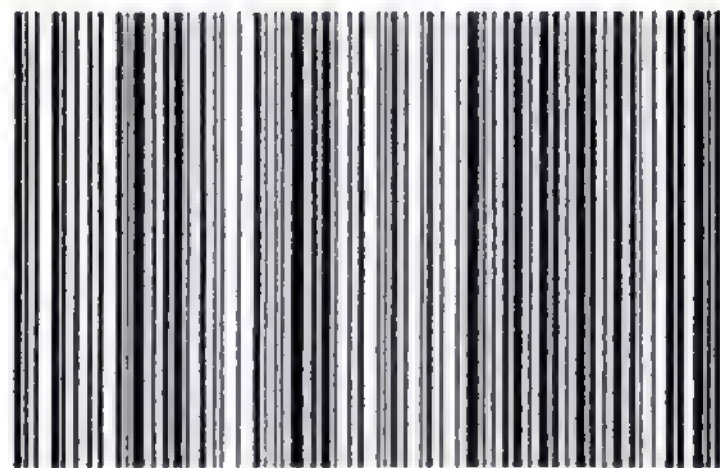
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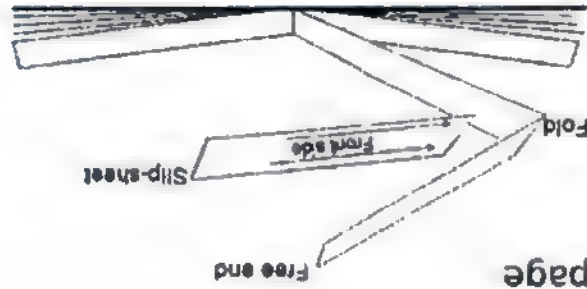
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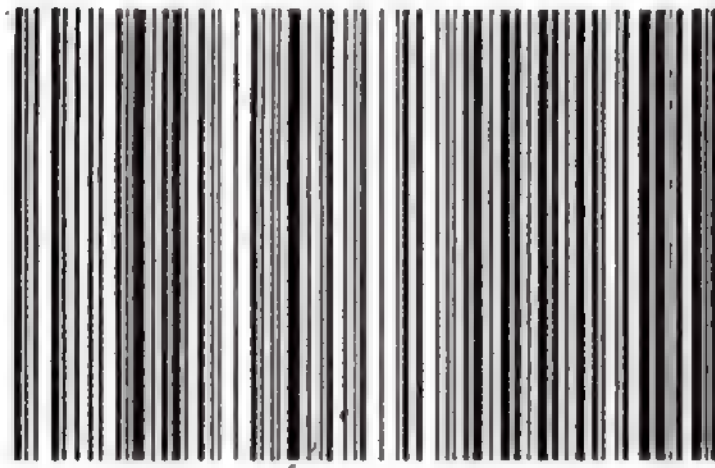
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Performance Graph



Ziff-Davis' Winstone 97 Version 1.0 produced scores of 16.9 and 36.4; 18.2 and 38.0; and 20.2 and 42.7 Winstone Version 1.0 units on its High-End Winstone 97 suite and Business Winstone 97 suite on Gateway 2000, Inc. PCs configured with 166MHz Intel Pentium Processor with MMX technology, 200MHz Intel Pentium Processor with MMX technology, and 200MHz Intel Pentium Pro processor, respectively. All Gateway 2000 PCs tested featured 32MB RAM, 256K RAM cache, 3.8GB hard disk, IDE controller, FAT file system, and no hardware disk cache. Systems include S3 ViRGE/VX graphics adapter; with 4MB VRAM with v1.23m3 driver; 1024x768 with 256 colors; and a refresh rate of 75Hz. Test systems used MS DOS 7.1 and MS Windows 95. All products used in the test were shipping versions available to the general public, and the test and its results were not verified by Ziff Davis.

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The Dakota Keykeeper —
Gateway 2000 Security Guard,
Ed Redenius, shown here on
the screen of a desktop PC.



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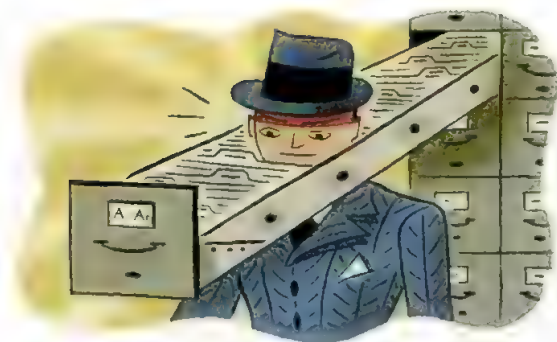
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FILE-VIEW

utilities

The can openers of the working world, these essential utilities can quickly display files in a wide range of formats. No longer must you face the anxiety of files' "No Trespassing" signs. *By Edward Mendelson*

Computer users, like everyone else, can suffer from the curse of Babel. When you need to look at a file created by a word processor, spreadsheet, database, or graphics program that you don't have installed on your computer, there's a good chance you'll be out of luck. Either your computer won't open the file at all, or you'll be able to see only incomprehensible, random-looking letters and symbols. The solution to this problem is a file viewer, a utility designed to display the contents of files created in a variety of formats. Even if you never need to read files created in alien formats, a file-viewing utility might very well be for you. These packages let you see the contents of your files more quickly (because you don't have to launch a full-blown word processor or graphics program), and they let you view files without the risk of modifying content.

Quick View is the basic file-viewing system that ships with Microsoft Windows 95, and it displays the contents of only a few major text and graphics formats. For most users, Quick View isn't robust enough, and they need to purchase one or more third-party utilities. These programs can work in three different ways. Some viewers attach themselves to the right-click context menu much like Quick View. Others run as traditional standalone viewers with their own

dialogs, in which you select a file and view it. And finally, some programs optionally install themselves as plug-ins for your Web browser. Most of these viewers can be used in more than one of these ways.

The basic job of a file viewer is to display the contents of a file as quickly as possible. All viewers let you search for text within files, while some convert files from one format to another. Still others include file management features. Your choice should depend on many factors.

Some programs support the latest formats, such as those in Microsoft Office 97; others lack support for the newest formats but can display files in dozens of Macintosh- and Unix-based formats, as well as in obsolete PC formats. Some viewers integrate themselves tightly into Windows, while others force you to learn a separate interface. Most of these programs let you view and decode files in .ZIP archives, while some also enable you to work with less common file compression formats.

If you need a viewer program only to look at graphics files or to convert files between PCs and Macs, you may prefer a specialized viewer to an all-purpose viewing program (see the sidebars "Graphics File Viewers" and "From Mac to PC and Back"). No matter what type of file you need to access, one of these products should do the job.



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www.pcmag.com

Adobe Systems Inc.

Adobe File Utilities

Based on a package first released by Mastersoft (a vendor recently acquired by Adobe Systems), Adobe File Utilities, Version 1.0, is a massive collection of viewers, converters, and file-comparison utilities. Designed for users who need access to a variety of files across multiple platforms.

This \$150 package includes the Viewer95 file viewer (and Viewer 3.1 for 16-bit

Windows), along with the Word for Word document-converter in versions for 16- and 32-bit Windows, DOS, and Unix platforms. It also comes with the DocuComp file-comparison program in versions for 16- and 32-bit Windows platforms and the Macintosh.

For this roundup, we focused on Viewer95, a mixed bag of strong and weak features. Viewer95 shares its file converters with the well-established Word for Word. But some of the viewers

are showing their age and don't display files created by recent versions of major applications. You can download updated modules for part of the package from Adobe's Web site, but Adobe doesn't offer a single upgrade file containing all the newer modules.

The program displays all major Windows, DOS, Macintosh, and Unix word processing, spreadsheet, database, and graphics formats, including AutoCAD and many Unix graphics formats. The

Graphics File Viewers

By Edward Mendelson

Let's face it: A full-scale file-viewing package may be overkill for most of us. Few users ever really need to look at files created in obsolete word processors such as Total Word or PeachText 5000. Instead, a graphics file viewer may be all you need.

A special-purpose graphics file viewer can display images created in popular formats such as JPEG, .PCX, or TIFF at top speed, and it is worth having on your disk, even if you also use a full-scale package for viewing word processing, spreadsheet, and database files. Most graphics file viewers also offer conversion and image-modification features. All display a variety of bitmapped formats, and some display widely used vector formats as well. None support Kodak's new FlashPix format.

Image Commander (\$19 list) displays 37 bitmapped formats and 10 vector formats—more than any other product in its class—and displays the majority more quickly than any other product on the market. You can convert any image in the program into almost all supported bitmapped formats, and menu options let you resize and rotate images; change brightness, contrast, and color depth; and select part of an image to save as a separate file. The interface uses standard Windows dialog boxes and shortcuts, and it takes only seconds to learn.

Unlike most other viewer programs, Image Commander doesn't

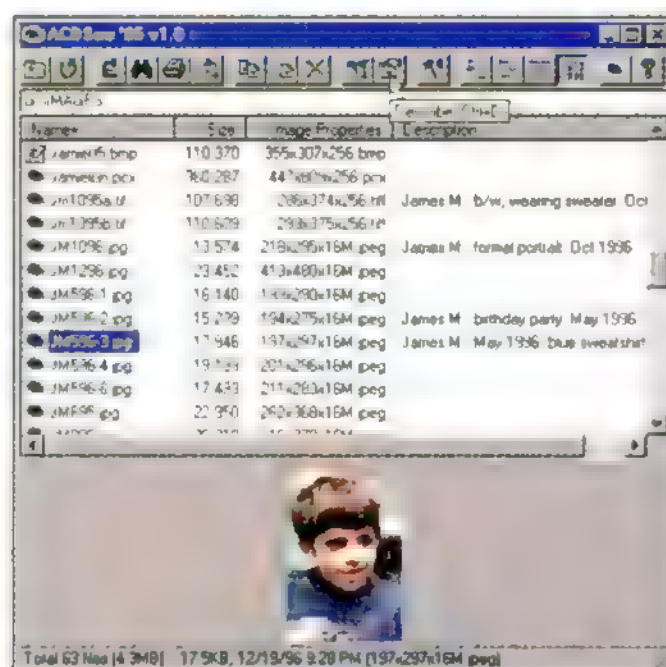
cause headaches by grabbing file associations (which determine which programs open which file types in Windows Explorer) from other programs. Rather, Image Commander lets you decide at any time which file types, if any, to associate with the viewer program. (JASC, Eden Prairie, MN; 800-622-2793, 612-930-9800; www.jasc.com.)

If you have problems remembering filenames, try ACDSee Systems' \$30 **ACDSee95**, which displays thumbnail images of files—something Image Commander can't do. ACDSee displays eight major file types at blinding speed and gives you the option of displaying thumbnail images as you scroll through a directory. The nonstandard interface has no menus, only a toolbar, but it is simple and elegant enough to navigate easily, and it uses extensive keyboard shortcuts for fast opera-

tion. You can choose which files to associate with the program only during installation, but a right-click menu in the file list lets you choose the default program for editing each graphics file type that ACDSee views. ACDSee Systems, Victoria, British Columbia, Canada; 800-414-2237, 250-361-8162; www.acdsystems.com.)

LView Pro, Leonardo Loureiro's popular \$30 viewer, displays thumbnail previews of seven graphics formats; it also converts unencoded files into their original forms without stealing file associations. It's not as fast as ACDSee or Image Commander, but it does offer a wider variety of image-transformation options, including the ability to set a custom number of palette colors for the best possible display of images in browsers. It also lets you specify sets of image-transformation commands and apply them with one click. A \$40 CD-ROM version includes image cataloging software and a selection of photographs. (LViewPro; www.lview.com.)

Other notable graphics file viewers include Hamrick Software's \$40 **VuePrint 5.0**, which plays video and sound files and runs graphics slide shows. (Hamrick Software, Phoenix, AZ; www.hamrick.com.) In addition, Irfan Skiljan's **IrfanView**, a compact freeware program that supports 13 formats, may be the only graphics file viewer you need. (Irfan Skiljan; stud1@tuwien.ac.at/~e9227474).



ACDSee95 gives at-a-glance graphic file information.

Editors' Choice

• Quick View Plus 4.0



When it comes to file viewers, the adage "less is more" rings true. The ideal file viewer should stay out of the

way until you need it. It should be easy to get to, whether you're at the Windows desktop or browsing the Web. And of course it should be able to display a broad range of file types effortlessly. That is precisely how Inso Corp.'s Quick View Plus 4.0 operates. The Editors' Choice winner in last year's roundup, Quick View Plus is once again the clear choice among the products in this category.

Like the minimalist Quick View bundled with Microsoft Windows 95, Quick View Plus is tightly integrated with the Windows 95 and Windows NT interface. But Quick View Plus provides support for many more file types including most major PC and Macintosh word processing, graphics, spreadsheet, database, and compression formats. We were impressed with how accurate the Quick View Plus viewers were, even with complex documents. The program also adds features such as Quick Print one-



click printing of multiple files.

Quick View Plus is accessible from the right-click context menu in Windows Explorer or any standard File/Open or File/Save dialog box. You can also drag and drop files onto the Quick View Plus Taskbar icon to view them.

For Internet users, Quick View Plus offers many convenient features. We were especially impressed with the package's ability to display hyperlinked files and decode unencoded attachments on the fly. The Quick View Plus viewer also works as a Netscape Navigator plug-in or as an ActiveX component in Microsoft Internet Explorer.

A smooth, reliable program that plays well with others, Quick View Plus is becoming the standard for file viewing in Windows.

Quick View Plus can handle most of the file types you're likely to work with, but if you need to view files saved in less common formats, take a look at FTP Software's KEYview Pro 5.1. Although not as reliable or easy to use as Quick View Plus,

KEYview supports a wide range of formats—from the Unix word processor Quadraton Q-One to the new Portable Network Graphics (.PNG) format. And KEYview allows you to convert files between formats and work with files in compressed archives. The Pro version also includes PGP encryption.

Finally, we should note that none of the products we reviewed offered support for the new Microsoft Office 97 file formats. Most vendors, however, plan to offer free updates online to handle new file types.

Viewer runs in two different ways. First, it can run as a File Manager-style standalone program, with a list of files in one pane and a viewer in the other. Or, second, it can be launched from the context menu in Windows Explorer, where it adds itself to Windows' native Quick View viewers.

You can convert viewed files to other formats, although conversions to HTML are crude compared with those of FTP Software's KEYview Pro 5.1. A beta version of a converter that produces PostScript output from other file formats can be found on Adobe's Web site. Hyper-

links in the viewing window aren't live, there's no tool or keystroke that allows you to move between sheets of a spreadsheet, and the program's keyboard shortcuts don't match the Windows standard. And though the standalone viewer can extract and view files contained in .ZIP archives, you cannot access these files via the right-click context menu as you can with other file types.

Despite its wide range of viewers and features, unless you need Adobe File Utilities for working with obscure file formats not supported by KEYview or Inso's Quick View Plus 4.0, you would probably

be better off looking elsewhere.

Adobe File Utilities. List price: \$150. Requires: 386-based PC or better, 4MB RAM, 18MB hard disk space, Microsoft Windows 3.1 or Windows 95. Adobe Systems Inc., San Jose, CA; 800-272-3623, 408-536-6000; fax, 408-537-7000; www.adobe.com. Circle 470 on reader service card.

Canyon Software Inc.

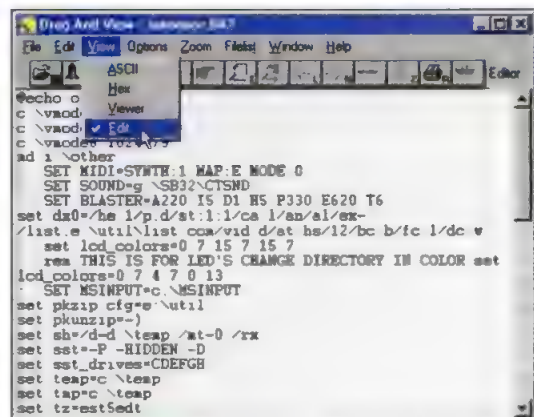
Drag and View 1.26

Most file viewers can get bogged down displaying an exact WYSIWYG representation of a given document. By contrast, Drag and View, version 1.26, from Canyon Software, gets straight to the heart of the matter by putting the file's text on your screen at top speed.

Canyon's \$35 utility for Microsoft Windows 95 and Windows NT 3.51 or later also displays images, spreadsheets, and databases in most major PC-based formats. Drag and View will even play multimedia files, including MIDI,



Adobe File Utilities' Viewer95 lets you tear off viewer windows from the main viewer screen.



Drag and View includes an option to edit as well as view ASCII and .RTF files.

.WAV, and .RMI sound files and .AVI video files.

But when it displays word processing documents, Drag and View forgoes the formatting and just displays the text. Because most users rely on a viewer for a quick glimpse at the contents of a file, Drag and View's strategy may suit your needs better than more elabo-

rate offerings.

The program runs either as a stand-alone viewer or from the right-click context menu in Windows Explorer. Unlike other viewers, Drag and View lets you edit ASCII files in its viewing window. A menu item lets you navigate between the pages of spreadsheets, and when you're viewing multiple files the menu and tool-

bar let you move rapidly and easily among them. When viewing .ZIP archives, you can see a list of the files contained in the archive; you can't extract or view the files themselves, however. Drag and View lets you rotate and convert bitmapped graphics to other formats.

Drag and View leaves some room for

From Mac to PC and Back

By David Haskin

No user is an island. And no computer should be either. Nevertheless, just about all of us have received disks containing important files that we couldn't access, because they originated from a Macintosh. Or in another case, we've needed to transfer data from a PC to a Mac.

For Mac users, the solution is simple: The Mac OS ships with a cross-platform file-exchange utility. Windows users, on the other hand, must rely on third-party programs to decipher Mac disks and transfer files back and forth. Fortunately, there are plenty of options to choose from.

All four programs reviewed here support Mac-formatted CD-ROM drives and Advanced SCSI Programming Interface-compliant devices, such as SyQuest's EZ drives and Iomega's Bernoulli, Jaz, and Zip devices. The programs enable you to format Mac disks from within Windows, and they automatically assign the correct filename extensions when you transfer Mac files to a PC. In addition, all but one let you create customized file-extension mappings.

Used with Windows 95, all four products support long filenames in both environments (for Macs, only when used with Windows 3.1). If you transfer those files to a DOS/Windows 3.1 environment, the products automatically truncate the long Mac names to fit DOS's short-filename convention.

The strongest programs in the group are the \$99 **Conversions Plus 3.5** and \$50 **MacOpener 2.0**, both from DataViz.

These products load a device driver so you can use Mac disks as though they

were normal PC disks. That means you can load files stored on Mac disks with compatible Windows applications, such as opening Mac Microsoft Word files with Word for Windows.

Conversions Plus and MacOpener are the only products in the group that enable you to view a file's contents. You can load multiple files for viewing and launch the copying process from the viewing window. To these skills, Conversions Plus adds file-format conversion. It can convert 36 common PC and Mac word processing formats, 26 spreadsheet formats, 19 database formats, and a dozen graphics formats. (Data Viz, Trumbull, CT, 800-733-0030, 203-268-0030; www.dataviz.com)

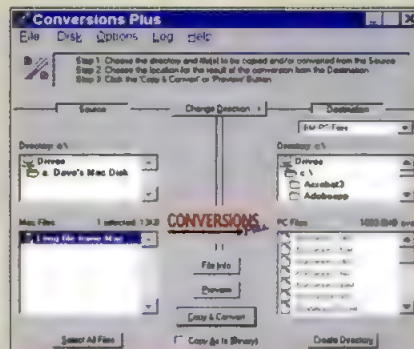
Here & Now 2.0, from Software Architects (\$75), takes a different tack, performing its file translation transparently. Like Conversions Plus and MacOpener, Here & Now lets you access a Mac disk directly from the Open dialog boxes of Windows 3.1 and Windows 95 applications, or with utilities such as File Manager and Windows Explorer. After installation,

the only interfaces Here & Now offers are for custom-mapping file extensions and for formatting Mac disks. (Software Architects, Bothell, WA; 206-487-0122; www.softarch.com.)

Xchange Software 1.4, from Optima Technology Corp. (\$49), is the most familiar product in the group, because it looks and acts like Windows File Manager. To transfer files, you simply drag them from one drive's window to another. You can perform basic management chores, such as creating, deleting, and moving folders, as well as renaming and deleting files. What's missing is the ability—provided by Here & Now, Conversions Plus, and MacOpener—to open Mac disks from within your Windows applications. (Optima Technology Corp., Irvine, CA; 714-476-0515; www.optimatech.com.)

That feature also is missing from Synchrony's Softcorp's **MacAccess2** (\$29.95). And MacAccess2 is the only product in this group that doesn't let you customize filename extension mappings. But it provides a simple interface for transferring files. Instead of menu options, there are toolbar buttons for tasks such as setting preferences, examining a Mac file's resources, and formatting a Mac disk. To transfer files, you highlight them and click on an arrow.

MacAccess2 performed as advertised but is somewhat underpowered when compared with the other programs. It does, however, offer one advantage for some users: It works in the DOS environment. (Synchrony Softcorp, Culver City, CA; 888-777-5600, 213-340-4100; www.synchrony.com.)



Conversions Plus can view the contents of files in a PC or Mac.



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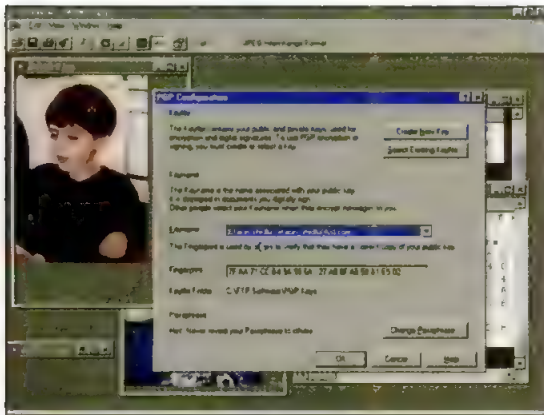
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improvement. For example, other than Word for Windows 7.0 and Excel 7.0, the package doesn't yet support up-to-date formats, such as Portable Network Graphics (PNG) or Office 97 file types. (Support for more formats is to come, however.) But you can use the package's ASCII or hex viewer to get an idea of the contents of any file on your disk.

Though not as elegant as some of the



KEYview Pro Includes PGP encryption for files displayed in the viewer.

other file viewers reviewed here, Drag and View is an attractive alternative if you want to find out fast what's in your files.

Drag and View 1.26. List price: \$35. Requires: 486-based PC or better, 8MB RAM, 5MB hard disk space, Microsoft Windows 95 or Windows NT 3.51 or later. Canyon Software Inc., San Rafael, CA; 800-280-3691, 415-453-9779; fax, 415-453-6195; www.canyonsw.com. *Circle 471 on reader service card.*

FTP Software Inc.

KEYview Pro 5.1

KEYview not only views files; it converts and compresses them as well. Though not as stable as some of the products here, KEYview boasts an impressive feature set and has come a long way since our last roundup a year ago.

We reviewed the Pro version (\$99.95) of KEYview, which is nearly identical to KEYview 5.1 (\$49.95). This version, however, adds the ability to encrypt files using the PGP (Pretty Good Privacy) algorithm. Both versions integrate tightly with Explorer and all major e-mail and groupware software, display and convert files in a range of formats, come with 16- and 32-bit configurations, and run under Microsoft Windows 3.1 or later.

FTP Software's package, which runs on Windows 95 and Windows NT 4.0, lets you work with files created using obscure Unix word processors such as Quadratron Q-One, HTML documents, or the new Portable Network Graphics (PNG) format. For Office 97 support, FTP offers a downloadable add-in on its Web site. A built-in multimedia player supports major sound and video formats, but the program displays database files only as plain text, and it doesn't have a hex viewer.

You launch KEYview either from the right-click context menu in Windows Explorer or as a standalone program. The

viewer window lets you zoom or rotate graphics and search for text. Hyperlinks are live, and you can highlight an Internet address and launch it in your browser. Toolbar icons allow you to navigate among worksheets in a large spreadsheet file. You can extract and view .ZIP and other compressed files.

For viewing Acrobat, AutoCAD, Envoy, and a few other formats, KEYview automatically uses Netscape Navigator plug-ins on your system. KEYview can install itself as a plug-in for Netscape Navigator and Internet Explorer (not as an ActiveX control), but unlike Quick View Plus, it requires you to run the full KEYview installation program from the CD-ROM to attach or remove the viewer from any other application. You can convert documents between formats (including barebones HTML), either from the viewer or with a separate batch-conversion program.

A minor annoyance is the KEYview tab that the program adds to the Properties sheet of most file types. The added tab is used to set options for KEYview, and it has nothing to do with the properties of the current file.

The program's viewers and converters aren't as crashproof and accurate as those in Quick View Plus 4.0, but KEYview Pro packs an extraordinary range of features into a compact package.

KEYview Pro 5.1. List price: \$99.95. Requires: 386-based PC or better, 4MB RAM, 4.5MB hard disk space, and Microsoft Windows 3.1 or later. FTP Software Inc., Andover, MA; 800-866-6539, 403-735-8900; fax, 403-735-8964; www.ftp.com. *Circle 472 on reader service card.*

SUMMARY OF FEATURES

File Viewers

	Adobe File Utilities 1.0	Drag and View 1.26	KEYview Pro 5.1	Quick View Plus 4.0	TurboBrowser for Windows 95 5.2c
■ YES ■ NO					
Products listed in alphabetical order					
Price	\$150.00 (list)	\$35.00 (list)	\$99.95 (list)	\$59.95 (list)	\$50 (street)
Installs as a standalone viewer	■	■	■	■	■
Searches for text in files	■	■	■	■	■
Converts graphics formats	■	■	■	■	■
Converts word processor formats	■	■	■	■	■
Displays unregistered file types	■	■	■	■	■
Hexadecimal viewer	■	■	■	■	■
Displays multiple text columns	■	■	■	■	■
File management	■	■	■	■	■
Zoom	■	■	■	■	■
Adds new viewers as separate files	■	■	■	■	■

* For Microsoft Word and RTF files only

Inso Corp.

Quick View Plus 4.0



Among all file viewers, Quick View Plus is the most accurate, the least troublesome, and the most tightly integrated with Microsoft Windows 95, Windows NT 4.0, the most popular browsers, and other applications. Inso Corp. also offers a 16-bit version of Quick View Plus (with the same features) to run under Windows 3.1.

When you install this package (\$59.95 list), it replaces Windows' native Quick View viewers (also written by Inso Corp.)



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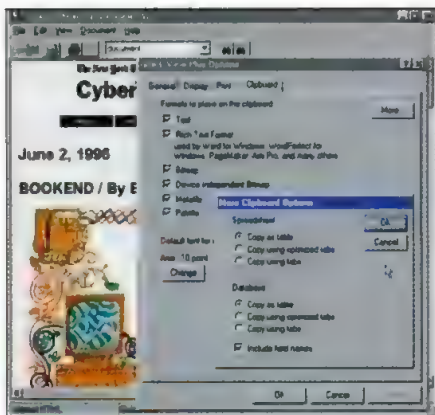
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Quick View Plus lets you customize the formats in which it transfers data to the Windows Clipboard.

with viewers that display far more file types and include a far greater range of convenience features, such as one-click printing of multiple files. Like Quick View, Quick View Plus 4.0 appears on the right-click context menu in Windows Explorer and any standard File/Open or File/Save dialog box. After you first use the context menu to view a file, a Quick

View Plus icon appears on the Taskbar tray, and you can open other files by either dragging them to the icon or double-clicking on the icon to bring up a File/Open dialog box. You can search text or switch from a graphic view to a hex or text view of the same file.

Hyperlinks in viewed files are live, and Quick View Plus displays the linked file in a separate window when you click on the link. Unencoded attachments display as hyperlinks, and when you click on the link, Quick View Plus decodes the file. You can extract and save embedded OLE objects to a disk.

Quick View Plus supports most major PC and Macintosh word processing, graphics, spreadsheet, database, and archive/compression formats, including AutoCAD and HTML. Its viewers are impressively accurate, even on relatively complex documents—although you can't expect complete accuracy on heavily formatted files. A tabbed interface allows you to view multiple worksheets in a spreadsheet file. Support for PNG (Portable Network Graphics) and Microsoft Office 97 will be

added through a free upgrade available from Inso Corp.'s Web site.

You can install the viewer as a Netscape plug-in or a Microsoft Internet Explorer ActiveX viewer, and a setup option installs the viewers in Corel WordPerfect, Lotus Notes and cc:Mail, and Microsoft Exchange. Major file managers such as Norton Navigator and PowerDesk also use Quick View Plus automatically.

All in all, we found Quick View Plus 4.0, like all good utilities, both unobtrusive and indispensable. This package is definitely worth a look.

Quick View Plus 4.0. List price: \$59.95. Requires: 486-based PC or better, 8MB RAM, 5MB hard disk space, Microsoft Windows 95 or Windows NT 4.0. Inso Corp., Boston, MA; 800-333-1395, 617-753-6500; fax, 617-753-6666; www.inso.com. *Circle 473 on reader service card.*

Pacific Gold Coast Corp.

Turbo Browser for Windows 95

Most file-handling utilities let you easily select multiple files from a single directory and print, copy, or compress all of

A deciduous plant native to the north temperate zone. Foliage may cause cooling of the Earth's surface by blocking energy radiated from the sun.

A mammal of the genus *Equus*. Equipped with outgrowths of scleroprotein which elicit a pleasant sensation when manipulated.

The HP Network ScanJet 5. Converts paper-based information into electronic data for transmission across LANS and WANS to a client PC, fax server, or network printer. Connects through Windows NT, Novell Netware 3x and 4x. Scans at 300dpi with a 15ppm automatic document feeder and flatbed capability. For more information, log on at www.hp.com/go/network_scanning.

Built by engineers.

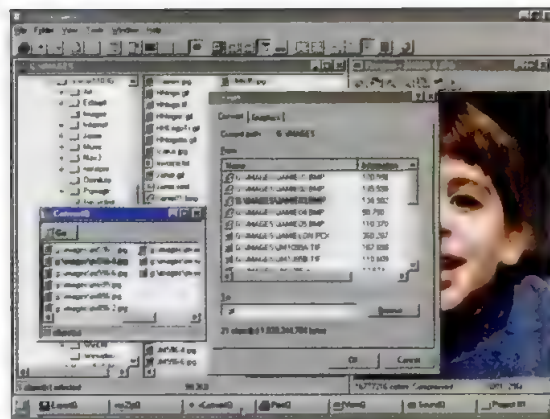
them with a single command. Turbo-Browser for Windows 95 uses an easy, one-step process to help you perform the same tasks on multiple files stored in as many directories as are stored on your disk.

As a file manager or viewer, Turbo-Browser (\$50 street) doesn't rank with PowerDesk and Quick View Plus, but it does have a unique feature called Qbar, which lets you drag one or more files to a "queue" at any time in a Windows 95 or Windows NT session. You can then export, compress, print, or view the files at once. (A version for both Windows 95 and Windows NT is also available for a street price of \$75.) You can also drag files either from Turbo Browser or from any other Windows program. You can drag and drop bitmapped graphics files onto Qbar and convert them to a single format with one command. Sound files dropped on Qbar play in sequence. Customizable Qbar buttons let you gather files into a "project" folder for any purpose you like.

Turbo Browser's interface resembles

Explorer's, with the addition of a preview window and extra toolbars. The preview window displays most document formats as text only—and much faster than viewers that display formatting. It also displays the most common graphics, spreadsheet, and database formats. HTML files are represented in WYSIWYG fashion, complete with live hyperlinks, but you'll have to extract files from .ZIP archives before you can view their contents. Fuzzy searches are supported both within files and when searching for files containing text.

Turbo Browser's interface is inconsistent and often confusing. For example, you can view .ZIP files in one window but must extract them in another. And toolbars tend to appear and disappear seemingly without reason. But if you're willing to put up with these annoyances, you won't find a feature like Qbar anywhere else. □



Turbo Browser's Qbar lets you batch-convert bitmap files in multiple formats into a single format.

Turbo Browser for Windows 95. Street price: \$50; for Microsoft Windows 95 and Windows NT, \$75 (street). Requires: 486-based PC or better, 2MB RAM, 3MB hard disk space, Windows 95 or Windows NT 4.0 or later. Pacific Gold Coast Corp., Glen Cove, NY; 800-732-3002, 516-759-3011; fax, 516-759-3014; www.turbobrowser.com. Circle 474 on reader service card.

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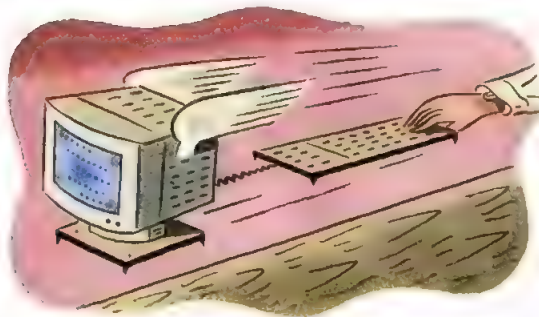
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PERFORMANCE enhancers

The easiest, most cost-effective way to improve PC or CD-ROM drive performance may not be a hardware upgrade. Six utilities offer an alternative—with varying degrees of success. *By Larry Seltzer*

There are plenty of ways in which you can use hardware to boost your PC's performance: Add more system memory, upgrade to a faster CPU or hard disk, swap out your old graphics card for a faster one. These solutions generally cost at least \$100, and most cost more. But you can also choose from some software products that are intended to improve the performance of a PC or its components, and their prices are much more attractive. We tested six such products in three different categories: RAM compressors, disk accelerators, and caching CD-ROM accelerators. In our testing, the extent to which these products improved performance varied depending on system configuration.

RAM COMPRESSORS

We reviewed two products in the RAM-compressor category: Helix Software Co.'s Hurricane, Version 2.0, and Quarterdeck Corp.'s MagnaRAM 97. Both intercept the virtual-memory process of Windows 95 and Windows 3.1 and attempt to decrease the data that Windows pages to the hard disk (which is more time-consuming to access). Synchronys Softcorp's SoftRAM 3.0, a similar product not available in time for this roundup, likely will be available by the time you read this. (For a review of SoftRAM's previous version, see our issue of February 20, 1996, page 211.)

Windows lets programs act as if more memory were available than the system has in the form of physical RAM. When a program tries to allocate more memory than is present as RAM (at which point the system is said to be *overcommitted*), Windows finds the cached 4K areas (called *pages*) that have been least recently used by any running program (including Windows itself); it writes them out to the hard disk, in a process called *paging* or *swapping*. Windows then allocates that RAM to the program that asked for it. If another program requests the memory that was paged out to the disk, Windows clears another area (the least recently used one) and reads it back into RAM for faster access. This technique is called *virtual memory*.

RAM compressors largely take these functions over from Windows. When the system becomes overcommitted, the utility compresses the data and attempts to keep it in a RAM buffer rather than sending it to the hard disk. Eventually the RAM buffer itself becomes overcommitted, and the utility must page its contents to disk.

Each product also has an analysis tool that shows you how much data the utility has compressed and how much paging to disk it has prevented. This feature is useful at times for analyzing the program's behavior, but it doesn't do much for you in terms



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of doing your real job.

Our new tests exposed some weaknesses in the two RAM compressor programs (see our accompanying benchmark test results). Although Hurricane accelerated most classes of operations, we found instances in which it slowed performance. Its overall impact was far less than Helix claims. MagnaRAM 97 was in a worse position: We found it was actually detrimental to performance on the majority of our tests.

Based on our testing, we conclude that these products' effectiveness depends a great deal on the hardware you run and the kind of computing you do. The vendors themselves say that users who do not overcommit their systems with compressible data—for example, the broad number of users who run just a couple of office applications—should expect no benefit from RAM compressors. Our tests further show that some users who do overcommit their systems a great deal will not benefit either. We also demonstrated that users with very fast hard disks may see a net slowdown because of the performance trade-offs made by these products.

DISK ACCELERATORS

A new category in this year's roundup is disk accelerators. The sole representative here is Acceleration Software International Corp.'s SuperFasst!, which the company claims speeds up some hard disk I/O functions. Because the tests that we conducted on the RAM compressors involved a large amount of disk I/O, we ran SuperFasst! through the same tests. It boosted performance in some cases, but in most of our testing, SuperFasst! produced small performance decreases.

CD-ROM DRIVE ACCELERATORS

The final category of products accelerate CD-ROM operations. These three utilities—Acceleration Software International's d-Time⁹⁵, Micro Design International's PC-Kwik CD-ROM Express, and Quarterdeck Corp.'s SpeedyROM—all work on the same basic principle. Each speeds access by creating a cache file on the hard disk for CD-ROM operations. In our testing, the first time we used a CD-ROM in the presence of each product, acceleration was limited, although performance tended to be at least as good as with Windows 95

Editors' Choice

- No one stands out



We tested six products in three categories for this round-

EDITORS' CHOICE up, but no product so distinguished itself that we felt it deserved to receive an Editors' Choice award.

In our first two categories, RAM compressors and disk I/O accelerators, performance was the problem. Quarterdeck's MagnaRAM 97 and Acceleration Software's SuperFasst! (the disk I/O accelera-

by itself. Subsequent reads from the CD-ROM drive proved to be quite a bit faster with all three products.

Several variables can affect these accelerators' performance, including the amount of space you allocate to the cache file, the speed of the CD-ROM drive and hard disk (PCs with slower CD-ROM drives and fast disks benefit more), and the operations you perform on the CD-ROM drive. Some functions, such as full-motion video playback, will not benefit from these products, because they generally don't read a sector on the CD-ROM drive more than one time.

THE BOTTOM LINE

Each of these six products is less expensive than almost any hardware solution is. Most offer some benefit, but some have the potential to slow performance (on some systems). In the following pages, we present a more detailed examination of these utilities, highlighting the areas in which they are most and least effective.

Before you decide to spend **Helix** your hard-earned money, you **the pr** should also consider the level of **—** hardware your PC already has, your work habits, and the types of applications with which you normally work. One of these products could be the inexpensive performance enhancer you seek. In the case of RAM compressors and disk accelerators, though, you may be better off spending your money on a hardware upgrade.

tor) did poorly, often hindering performance. Helix's Hurricane 2.0 improved performance but only by a disappointing amount. To get a real performance boost, a hardware upgrade would be best.

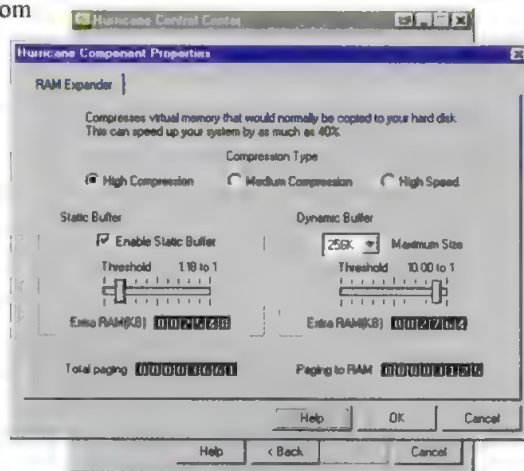
By contrast, the CD-ROM accelerators—Acceleration Software's d-Time[®], Micro Design International's PC-Kwik[®], CD-ROM Express, and Quarterdeck's SpeedyROM—improved performance markedly on our tests. Each of them earns an honorable mention, but because their performance differed relatively little, and they have comparable features and prices, no one product wins an Editors' Choice. If your computing calls for a software accelerator for your CD-ROM drive, any one of these products would do the job well.

Helix Software Co. Inc.

Hurricane

Helix Software Co. says that its memory manager Hurricane, Version 2.0, speeds up Windows operations by managing virtual memory effectively. Our tests show that Helix is correct—most of the time. But systems with very fast hard disks can lessen the product's impact.

Basically, Hurricane does its job by taking over and speeding up the management



Helix's Hurricane 2.0 shows you how effectively the product is using RAM to avoid paging.

of virtual memory. It does so by compressing data in memory to decrease hard disk hits. Under Windows 95, it can use spare graphics card memory as a buffer for compressed data. It tests data to measure compressibility. If the data's compression ratio exceeds a certain amount (defaulting to 8.33:1), Hurricane stores the data in its "dy-

PERFORMANCE TESTS

Performance Enhancers



Even though the vendors of these six utilities of three different types claim their products improve performance, we determined that only one set of products—the CD-ROM accelerators—consistently lived up to that promise.

What the Numbers Mean

RAM Compressors and Disk Accelerator On our tests, each of these three products appears to have failed to improve performance at least some of the time. Helix Software Co.'s Hurricane 2.0, however, accelerated the clear majority of operations and was the only product here to make a meaningful difference in overall performance. But the degree of improvement was less than Helix claims. In general, Hurricane produced 5 to 20 percent improvements, but even if you discount all the tests on which Hurricane slowed operations, the overall performance improvement is only 16 percent. A bad showing on two of the eight scores in the Office Applications category (not reported individually here) made Hurricane's overall Office Applications score worse than that of the unenhanced PC.

It's hard to define a clear scenario in which MagnaRAM 97 improves performance. It worsened Web browser operations slightly and fumbled the other tests badly.

Acceleration Software's SuperFassst! produced net slowdowns in three of the four categories, and the utility was about as likely to decrease performance as to increase it. Overall, the impact of SuperFassst! was slight. Moreover, with this kind of utility, which tinkers with some of your PC's fundamental processes, we think you should know how the product operates. Unfortunately, Acceleration Software was not very forthcoming with this information.

In addition, none of the products came close to improving system performance the way increasing RAM from 16MB to 32MB did. These utilities certainly cost much less than additional RAM (espe-

cially on a notebook), but sometimes you get what you pay for.

CD-ROM Accelerators Each of these three products improves CD-ROM I/O, with 29 to 68 percent reductions in the time required to complete our tests. These are the sorts of numbers you should see in circumstances favorable to CD-ROM enhancers. Such circumstances are not unusual.

By contrast, using many CDs and changing them frequently, employing a relatively small cache file, and using a PC that has a smaller performance differential between the hard disk and the CD-ROM drive make life tougher for a CD-ROM cache. The cache has the most difficulty in accessing a CD for the first time, or at least the first time in a while. Because the accelerator uses the first access to prime the cache, subsequent runs are much faster. In these products' first runs, performance was typically about the same as with Windows 95 alone. We saw much greater performance improvement on subsequent runs.—*Analysis written by Larry Seltzer*

How We Tested

We used two test scripts for these products. The **RAM compressor/disk accelerator script** produces 51 numbers per run, and we grouped almost all of them into four categories (full results are available at www.pcmag.com). We report the total timing for each category. Some operations, such as certain application loads, figure into more than one category.

This script is designed to load many applications with large data sets. With the RAM compressors, the script results in frequent virtual-memory swaps. With the disk accelerator, it results in many application launches, a large amount of disk I/O from the applications, and frequent task switching between applications.

We tested the RAM compressors and the disk accelerator on a Pentium/133 PC with 16MB of EDO DRAM, an ATI Mach 64-based graphics card with 2MB of RAM, and a 2GB Western Digital 32100 EIDE hard disk. The unit was configured with Corel Draw 7.0, HiJaak Pro 4.0, Microsoft Excel 7.0, Microsoft Internet Explorer 3.0, Microsoft PowerPoint 7.0, Microsoft Word 7.0, Netscape Navigator 3.0, Picture Publisher 6.0, and Symantec C++ 7.2. Most of the script involves loading programs, inputting large amounts of data into them, manipulating that data, and switching between programs. Not all script operations are timed.

RAM COMPRESSORS AND DISK ACCELERATOR

Lower scores represent better performance.
Hours:minutes:seconds

	Web browser	Image-management software	Office applications	Application loads, quits, and switches
Micron P/133 (16MB RAM, 2GB EIDE hard disk)	0:04:24	0:42:33	0:07:21	0:04:48
—With Hurricane (RAM compressor)	0:03:40	0:39:45	0:07:47	0:04:03
—With MagnaRAM 97 (RAM compressor)	0:04:55	1:04:13	0:10:54	0:06:16
—With SuperFassst! (disk accelerator)	0:04:31	0:41:08	0:07:29	0:05:01
Micron P/133 (32MB RAM, 2GB EIDE hard disk)	0:03:11	0:11:49	0:05:06	0:02:57

CD-ROM ACCELERATORS

Lower scores represent better performance.
Seconds

	Corel Mosaic: View Images 1	Corel Mosaic: View Images 2	Visual C++
HP P/90 (16MB RAM, 2X CD-ROM drive)	11	21	223
—With d-Time ⁹⁵	5	9	72
—With PC-Kwik CD-ROM Express	4	8	73
—With SpeedyROM	4	8	72
Micron P/166 (16MB RAM, 8X CD-ROM drive)	6	10	76
—With d-Time ⁹⁵	3	7	48
—With PC-Kwik CD-ROM Express	2	5	53
—With SpeedyROM	3	6	45

The **CD-ROM script** uses two applications. For the first test, we install The Masters I, a CD-ROM from Corel Stock Photo Library 2, and perform View Directory operations to load two sets of thumbnails of images from the CD. For the other test, we install Microsoft Visual C++ 4.2, Enterprise Edition, keeping as many programs and libraries on the CD as possible. We then time a Rebuild All

operation on the Scribble sample program.

We ran each of the tests at least three times, rebooting between runs. As performance tended to improve substantially after the first run, we discarded the first run's score and calculated averages using only scores from subsequent runs.

We performed the CD-ROM tests on two PCs. The first was a Pentium/90-based HP unit with 16MB of RAM, a 2X Toshiba MX-4101B IDE CD-ROM drive, and a 500MB hard disk. The second was a Pentium/166-based Micron unit with 16MB of RAM, an 8X TEAC CD-512E IDE CD-ROM drive, and a 2GB hard disk. We set the cache file size to 50MB; for SpeedyROM, we set its two caches to a combined total of 50MB.

namic buffer" in main memory. If the ratio is less but still above a certain amount (defaulting to 1.18:1), Hurricane stores the data in the "static buffer" (mainly graphics card memory). Otherwise, it pages the data out to disk. Hurricane also pages data out to the hard disk when the static buffer is full.

Because Hurricane aims to keep data in memory and off the hard disk, it boosts performance more if the system has a fast CPU and main memory and a relatively slow hard disk. With a smaller performance gap between the system's RAM and disk, running Hurricane becomes less advantageous.

We tested Hurricane and its competition under both conditions—first with a standard 5,200-rpm EIDE hard disk and then, for comparison, with a fast 7,200-rpm SCSI disk. With the EIDE hard disk we saw some improvement in most cases. With the SCSI disk, however, performance suffered significantly. Compared with the unenhanced system, Hurricane took 5 percent less time with the EIDE disk but 11 percent more time with the faster hard disk.

It is not obvious where Hurricane slowed the system down, but slower operations were more frequent when the system was heavily loaded with applications and data. In all likelihood the slowdowns are evidence of large amounts of relatively noncompressible data. It may not be the application with the noncompressible data that suffers but the next one you run. That's because Hurricane does not attempt to compress data in memory until it needs to page the data out, and it won't need to do this until another application needs the memory.

For example, some of our image tests filled memory with poorly compressible data. When we switched to the next application, the system slowed as Hurricane attempted to compress and then had to page that data out of main memory to make room for the demands of the new application.

Hurricane also has some features for speeding up individual operations. It has a protected-mode RAM disk (the only one available for Windows 95), to which it directs temporary files from Windows appli-

cations. It has a cache for speeding up printing, particularly to local printers. And its minimizing feature, WinPack, releases more Windows memory and resources than the normal minimizing operation. Our test system became unstable when using this feature, however, so we don't recommend WinPack unless you can establish that it works in particular cases.

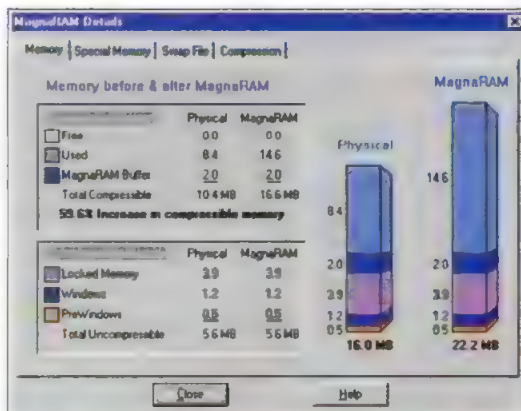
Hurricane also comes with an excellent system-analysis utility, Discover, which provides lots of information about your PC's hardware and software, as well as some simple synthetic benchmark tests.—Larry Seltzer

Hurricane, Version 2.0. Street price: \$40. Helix Software Co. Inc., Long Island City, NY; 800-451-0551, 718-392-3100; fax, 718-392-4212; www.helixsoftware.com. Circle 455 on reader service card.

Quarterdeck Corp.

MagnaRAM 97

Interestingly, Quarterdeck Corp.'s MagnaRAM 97, like Helix Software's Hurricane, has less impact on the performance of systems with faster hard disks.



Quarterdeck's MagnaRAM 97 analyzes its action and shows your memory gains.

But where Hurricane showed improvements on a number of our tests with a system that had a mainstream EIDE hard disk, MagnaRAM's performance was consistently poor across our tests regardless of the hard disk used. Our testing, however, also revealed that the package can have some interesting benefits whose usefulness depends on how often you reload applications during the day and how many applications you keep loaded.

Attempting to reduce disk I/O in the form of virtual memory, MagnaRAM ac-

cesses the CPU memory via a "dynamic buffer" instead of the hard disk. On a system with a fast disk, this technique's relative benefits decrease. Still, in a product designed specifically to improve speed, it's hard to excuse the slowdowns we found.

On our image-management test (our most memory-intensive test), operations took about 30 percent longer with MagnaRAM than without it. On one rotate operation in Quarterdeck's own HiJaak Pro, the test system took more than 70 percent longer with MagnaRAM. Overall performance on office applications was nearly as bad: Our results show that operations took 30 percent longer with the product than with the base system alone.

On 36 of 51 total operations, our test results were slower with MagnaRAM than without it; 3 of them took more than twice as long. Of those 36, 33 took more than 10 percent longer, still a significant penalty. We did see improvements in the rest of the operations, some reducing the test timings by more than 10 percent.

MagnaRAM has a feature called TurboLoad for accelerating the launch of applications. Because it stores information about the application in the registry and does not retain it for use until the next system boot, you must reboot after initially loading an application in order to see any benefit from TurboLoad.

Before running our test suite, we loaded and quit all the applications, then rebooted. We did see some performance improvements in application loading with MagnaRAM, but only early in the test sequence. By the time the system was loaded up with applications and paging heavily, application loads with MagnaRAM slowed considerably. One of them took nearly three times as long with the product as without it. Evidently TurboLoad needs free memory in the system in order to be effective, and it might therefore be of more benefit in a lightly loaded system.

The control panel provides information about what the program is doing, how much memory it has compressed, how much disk swapping it has prevented, and how much time it has saved. But the control panel's claims about saved time are dubious: It continued to make such assertions even after our tests indicated a slowdown from the base measure. The

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control panel also allows you to enable MagnaRAM's features, including Cache-Back, which takes unused memory from Windows 95's disk cache.

QEMM, Quarterdeck's memory manager, contains a version of MagnaRAM, but it's an earlier release that does not have MagnaRAM 97's features.—LS
MagnaRAM 97. Street price: \$40. Quarterdeck Corp., Marina Del Rey, CA; 800-683-6696, 310-309-3210; www.quarterdeck.com. Circle 454 on reader service card.

Acceleration Software International Corp.

SuperFasst!

Acceleration Software International Corp. (formerly Ballard Synergy Corp.) describes SuperFasst!, Version 1.1, as a hard disk accelerator. The product is designed to accelerate application launches, multitasking, and file systems, but our tests show that it does not significantly improve performance in most cases. (Synchronys Softcorp's recently released windrenalin hd is a licensed version of SuperFasst!)

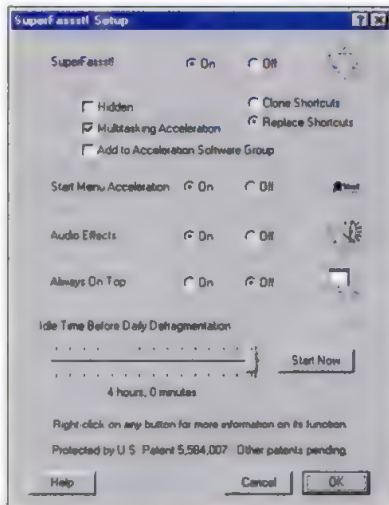
SuperFasst! replaces parts of Windows with custom code designed to accelerate particular functions. According to Acceleration Software, SuperFasst! works at the operating system's lowest device-independent layers, to make Windows' accessing of the hard disk more efficient. Theoretically, with the minimizing of random hard disk accesses, more disk I/O takes place in bursts of raw data transfer.

To accelerate application loads, you must create and launch a special shortcut to a program. You can make this shortcut either by dragging the program's icon to the SuperFasst! window or by enabling acceleration via the Start menu. In the latter case, every time you run an application off the Start menu or any of its submenus, SuperFasst! automatically accelerates the program. SuperFasst! notes this fact in the name of the application; for instance, the product changed *Microsoft Excel* to *Microsoft Excel*

(*SuperFasst!*) in our testing. (We launched all applications off the Start menu after enabling Start menu acceleration.)

SuperFasst!'s authors believe strongly in disk defragmentation, and they set up the system to defragment the disk by default after 4 hours of idle time. You can control this setting in the setup screen.

Using the EIDE drive in the test system, we saw a large range of performance increases and decreases, as it took from 42 percent more time to 39 percent less time, with 31 of 51 tests resulting in a slowdown. When we compared groups of tests, or added them all up, the difference relative to the base system was close to zero. Overall, SuperFasst! took less than 2 percent longer, which is within our tests' margin of error.



Acceleration Software's SuperFasst! can schedule hard disk defrags.

percent longer, which is within our tests' margin of error.

Acceleration Software made an important point to us: Our tests involve a great deal of disk I/O in virtual-memory form, but SuperFasst! does not accelerate such I/O in the current version. (The vendor plans to include support for this function in Version 2.0.) But even so, a great deal of the disk I/O in our testing does not involve virtual memory, and SuperFasst! still demonstrated no meaningful improvement.

The company's claims about the product's ability to improve performance ("Makes your hard drive up to 496% faster") are hard to take seriously, and our performance tests did not back them up. The manual's similar claims about hard disks are also farfetched.

Citing intellectual property rights, Acceleration Software is unwilling to discuss the details of

how its product does what it claims. This stance increases the difficulty of determining how well SuperFasst! works. We have certainly found a few situations in which the product boosts performance, but it does so inconsistently, even on functions for which the company specifically claims a boost (such as application loads). Versions 1.2 and 1.3 of SuperFasst! should be available by the time you read this.—LS

SuperFasst!, Version 1.1. List price: \$49.95. Acceleration Software International Corp., Seattle; 800-754-1128, 360-697-9260; fax, 360-598-2450; www.accelerationsw.com. Circle 452 on reader service card.

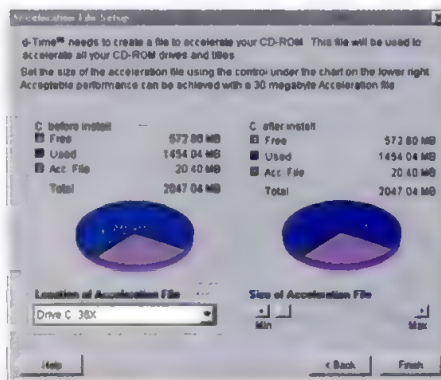
Acceleration Software International Corp.

d-Time⁹⁵

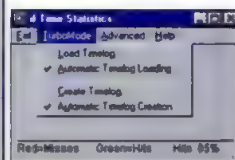
The CD-ROM accelerator d-Time⁹⁵, from Acceleration Software International Corp., is not only a passive cache like the other tested CD-ROM products; it also supports *timelogs*, which enable automatic acceleration and are basically summaries of the status of the cache file for certain applications. Like the other products, it performed well.

First, d-Time⁹⁵ assesses your CD-ROM drive's speed and predicts the speed it will have after the product does its work. The accelerator also estimates your hard disk's speed in order to assess the impact of the hard disk-based cache on CD-ROM performance. (In our case, the projected CD-ROM improvement was dramatic: d-Time⁹⁵ told us that our 8X drive was a 7X and that it would perform like a 31X.) When you install the product, one of the last steps is to run the Windows 95 program Defrag.

Although the documentation claims



Acceleration Software's d-Time⁹⁵ lets you choose how much hard disk space to set aside for the CD acceleration file during setup.



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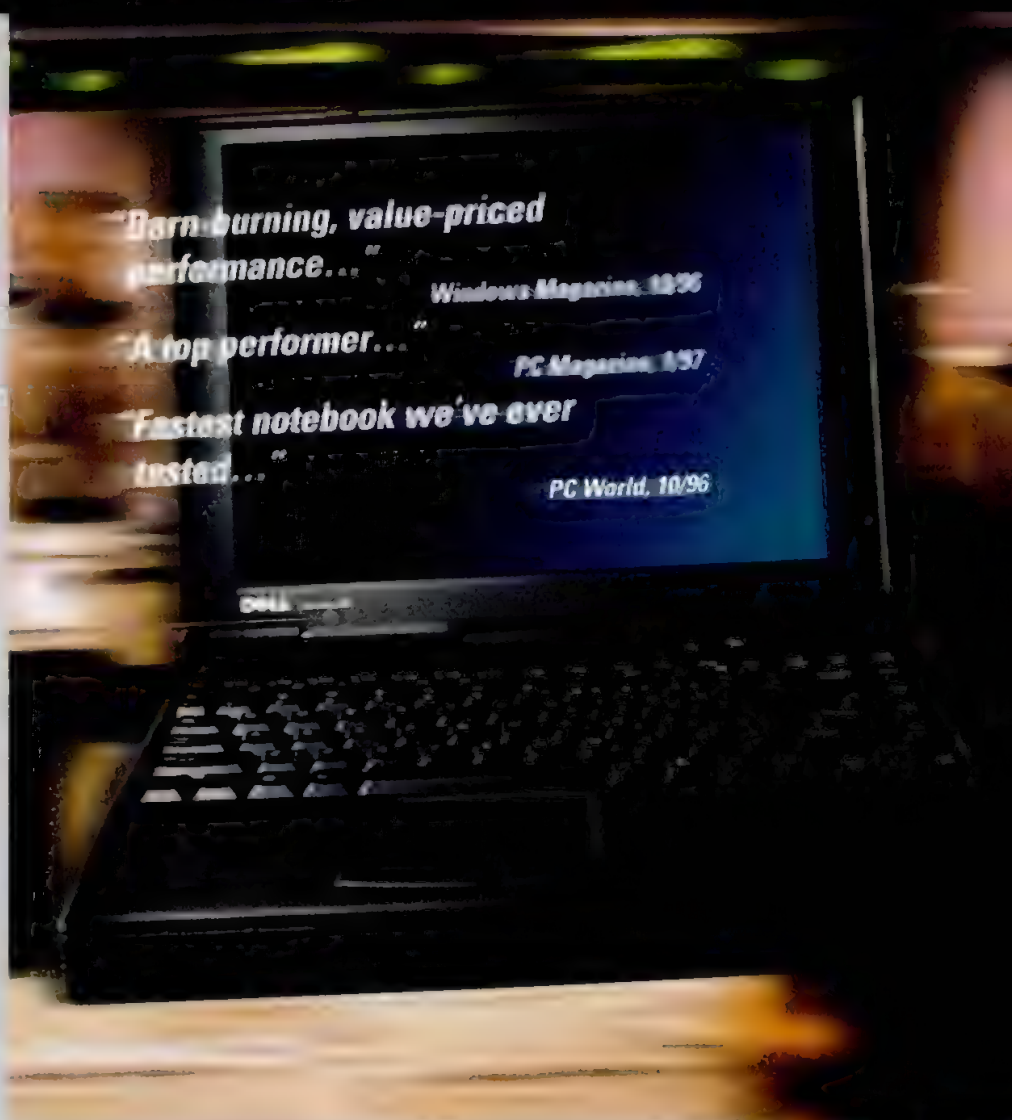
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improvements even for the first run of the product, in our testing, performance the first time typically took a little longer with d-Time⁹⁵ than without it. But afterward, performance was always considerably faster with the product.

The timelogs are a way of capturing and later reloading the cache file's contents. You control timelogs through Statistics, which shows a running assessment of the hit ratio in the d-Time⁹⁵ cache. The documentation suggests that once the hit rate on a CD reaches 80 percent or higher, you should create a timelog for it.

We didn't examine timelogs in great depth, but for some tests we set d-Time⁹⁵ to load and create them. Performance actually decreased slightly. Although you might see better results under different circumstances, we don't feel the timelogs were necessary. Performance was certainly good enough without them.—LS
d-Time⁹⁵. Street price: \$50. Acceleration Software International Corp., Seattle; 800-754-1204, 360-697-9260; fax, 360-598-2450; www.accelerationsw.com. Circle 452 on reader service card.

Micro Design International Inc. **PC-Kwik CD-ROM Express**

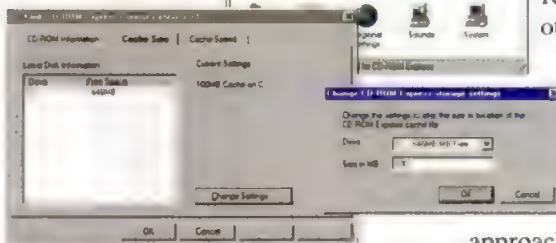
Micro Design International's PC-Kwik CD-ROM Express is the least complex of the three CD-ROM accelerators we tested; its performance was arguably the best. Like the others, it tests the performance of the CD-ROM drive and hard disk during installation. As with the others, its packaging suggests that performance will dramatically improve, and that's exactly what we saw. The product shaved from 30 to 70 percent off the unenhanced test timings, depending on the test.

CD-ROM Express's installation program has a nasty bug, though. It seems to come from the Windows SDK sample SETUP program on which the installation program is based. In some circumstances, when choosing the Express setup option, we observed complicated messages about the source file line where an error occurred; they told us to report the problem to Microsoft Product Support Services. We have seen this glitch in other programs based on the same sample. The solution is to use the Custom setup option.

After installation, your only direct interaction with the product is via the

CD-ROM Express Control Center. The only option you might change is the cache file size.

Performance on



PC-Kwik CD-ROM Express lets you review disk space and cache file size.

the Visual C++ test, using our Pentium/166 PC, was a little unusual. On the base system, this test took an average of 76 seconds after the first run. With d-Time⁹⁵ and SpeedyROM, the second run took 48 and 45 seconds, respectively, and the results were similar for subsequent runs. With CD-ROM Express, the test took 69 seconds on the second run, 46 seconds on the third, and 44 seconds on the fourth. We didn't observe this kind of graded decline in any other tests of these products.

Despite the occasional flaky performance, we were impressed with CD-ROM Express's speed and simplicity.—LS

PC-Kwik CD-ROM Express. Street price: \$50. Micro Design International Inc., Winter Park, FL; 800-228-0891, 407-677-8333; fax, 407-677-8365; www.pc-kwik.com. Circle 453 on reader service card.

Quarterdeck Corp.

SpeedyROM

Boosting performance is what CD-ROM accelerators are all about, and Quarterdeck's SpeedyROM did as well as the others. Unlike them, it does not test your hard disk or CD-ROM drive to predict the effect on performance, although it does track such statistics as cache hit ratio. This is just as well, as such tests are of dubious value, even if they are accurate.

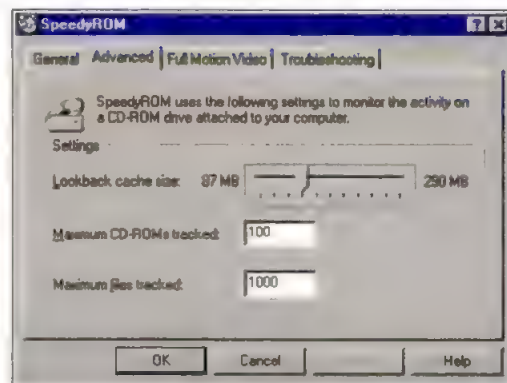
The control panel offers the usual options for configuring cache file sizes, disabling the product for troubleshooting, and relocating the cache to other drives.

You shouldn't need to change your choices once you are comfortable with the settings. (Cache size is probably the only setting you'll want to select yourself.)

Although many of SpeedyROM's features are similar to the other packages, it has two caches, the *persistent cache* and the *lookback cache*. The former contains data from the CDs you read, and the latter holds the history list information, the usage statistics, and so on. This

approach does not seem to be the innovation that Quarterdeck claims, as the other products certainly consolidate such information into their single caches. In any event, the method did not affect performance: SpeedyROM was about as fast as the other products on all our tests.

The strategy does provide an excuse to default to much larger caches: The persistent cache defaulted to 100MB and the



Quarterdeck's SpeedyROM provides access to program settings and offers troubleshooting tips.

lookback cache to 87MB. These amounts are considerably larger than d-Time⁹⁵'s 20MB (in the custom setup) and CD-ROM Express's 29MB, even though some would argue that less space is reasonable for such a dual cache as SpeedyROM's. We set its caches to 25MB each, just as we set the other products' single caches to 50MB.

There were no installation problems, and the product realized its promised performance boost.—LS □

SpeedyROM. Street price: \$40. Quarterdeck Corp., Marina Del Rey, CA; 800-683-6696, 813-523-9700; fax, 813-532-4222; www.quarterdeck.com. Circle 454 on reader service card.

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Source: PC World's best overall PC company for reliability and service, December 1998.

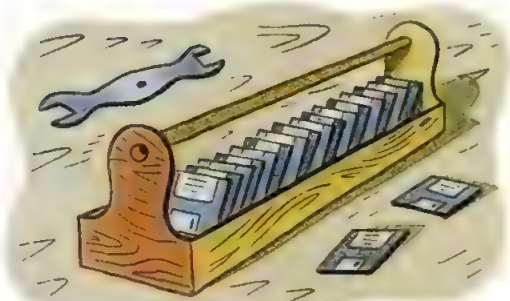


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MISCELLANEOUS utilities

Want to build a better desktop, keep your data private, get the most out of your hard disk, or just find some great shareware or freeware? It's all right here, along with other useful utilities. *By John Morris*

In the U.S., tinkering with the family car has long been a national pastime. In the nineties, working on the personal computer has attained similar stature in many homes.

Most PCs come fully loaded with everything from multimedia peripherals to all the basic software you'll need. Some vendors even throw in an expensive office suite. Nevertheless, the first thing most power users do after they buy their PCs is begin personalizing them. One of the least expensive ways to do so is to install utilities that keep your PC running like a new Rolls Royce—or at least make it more fun to drive.

In this section, we looked at a host of little utilities that didn't fit into regular categories but are still worth considering. Microsoft Windows 95 has made personal computing a lot more convenient, but there's always room for improvement. *Desktop enhancers* such as Norton Navigator and PowerDesk Utilities enhance the Windows 95 desktop to help you be more productive.

With all the files available off the Internet—not to mention the growing prominence of e-mail—there's never been a greater need for *file compression* utilities. Out of the numerous compression programs, we selected a handful of the most popular ones and looked at them head to head to see which were the easiest

to use and most feature-complete.

In a separate section of The 1997 Utility Guide, we examine encryption tools for e-mail. But here we take a look at another use for *encryption utilities*—protecting the files on your hard disk from prying eyes. These simple but effective programs can help safeguard your data.

Even though many PCs today ship with hard disks of 2GB or more, you could be wasting valuable space if your hard disk is not properly configured. *Partitioning tools* let you create and modify disk partitions as well as change cluster sizes to maximize your disk space. And in case you want to run multiple operating systems on your PC, we review V Communications' System Commander, a *multiboot utility* that supports up to 100 operating systems on a desktop PC.

Last, we take a look at a selection of *top shareware/freeware* gems. These range from an applet that keeps your system in sync with an atomic clock to programs that make desktop navigation easier or help you get more out of such Windows tools as the Clipboard.

So no matter what you're trying to do, chances are good that there's a low-cost or even free utility to help you out. As Ross Perot says, if you want to fix a problem, "you've got to get under the hood."



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DESKTOP enhancers

These utilities help you get around Windows faster. BY EDWARD MENDELSON

The introduction of Microsoft Windows 95 went a long way toward making your PC easier to use, and more efficient. But there is always room for improvement, and that's where these two handy utilities come in: making everyday chores such as finding and viewing files, launching programs, or selecting your printer even easier.

Symantec Corp.'s **Norton Navigator for Windows 95** (\$100 street; 800-441-7234, 541-334-6054, www.symantec.com) is really two utilities in one package. First, it's a standalone file manager that looks and acts like an improved version of the Windows 3.1 File Manager. Second, and far more valuable, it's a set of unique, innovative enhancements to the Windows 95 interface. You'll probably

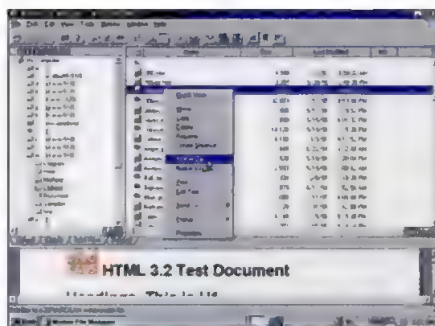
use Norton File Manager once or twice and then forget about it. But after you've used some of the Windows enhancements in this package, you'll probably wonder how you ever got along without them.

Norton Navigator's best time-saving enhancement, FileAssist, is a set of buttons added optionally to all Windows File/Open and similar dialog boxes. Two of these buttons lead to lists of files and directories previously accessed from the same dialog box; a third pops up a configurable list of file management commands, including encryption and compression. You can attach a similar list of commands to the right-click pop-up menu in Explorer. Another enhance-

ment adds long-filename support for 16-bit programs. Navigator's File Manager doubles as a file viewer if you have Quick View or Quick View Plus installed (reviewed under "File-View Utilities" in

this issue), and it can also list recoverable deleted files. But it's not as good a file manager as PowerDesk's ExplorerPlus.

Few utilities are unmistakably the best of their kind, but the file manager and toolbar utilities in Mijenix Corp.'s **PowerDesk**



Norton File Manager uses its own right-click menus.

Utilities (\$40 street; 800-645-3649, 608-277-1981, www.mijenix.com) leave the competition in the dust. The file manager, called ExplorerPlus, is not only elegant and feature-packed, but because it's a superset of the Windows 95 and

Top Shareware/Freeware Utilities

Bruce Adelman's **AtomTime** (free; www.winternat.com/~adelman/software) does one thing and does that very well: It matches your PC's clock with official atomic clocks. There are several similar utilities, but we like this one because of its simplicity. Click a button to log on to a time server and AtomTime displays the discrepancy between your PC's time and the official time. With another click, you can adjust your system's time automatically to the official time.

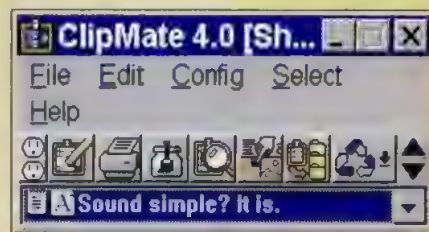
ClipMate 4 (\$25 list; Thornsoft Development, www.thornsoft.com) rectifies one of Windows 95's biggest shortcom-

ings: Its Clipboard can hold only one item at a time. ClipMate saves everything you cut or copy. If you click on its system tray icon, you can select any previous item from a drop-down list. It has a search capability, so you can find precisely what you're looking for among the clippings, as well as the ability to print your clippings. You also can organize your clippings into collections.

When you want to open a folder in Windows Explorer, **DirNow!** opens it fastest (ftp://www.comm.utah.edu.au/pub/win95/dirnow). Paul Smith's free-ware utility consists of a tiny window where you enter the first few letters of a folder name. The program consults its list of your folders and opens the matching one. If more than one folder matches the letters you typed, you choose among them in a pop-up list. Keyboard shortcuts hide and reopen the DirNow! window. Everything about the program is fast, efficient, and unobtrusive—a real time-saver.

Intel Corp.'s **InstantOn Scheduler 1.1** (free; www.developer.intel.com/ial/

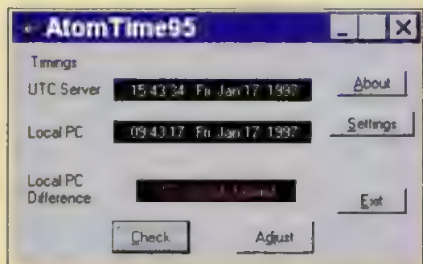
[inson/install.htm](http://www.developer.intel.com/ial/inson/install.htm)) is a robust program for scheduling program launches. You can use it to configure your PC to perform mundane tasks such as defragmenting your hard disk at night. Instant-On is noteworthy because, unlike other



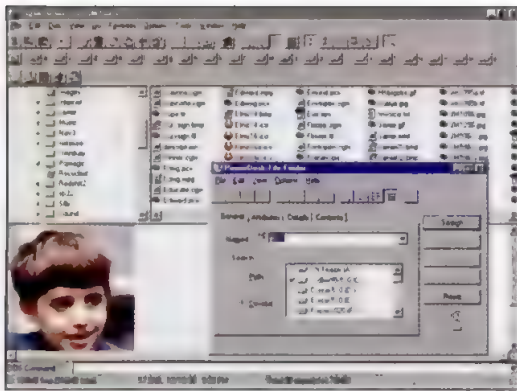
ClipMate turns the Clipboard into a virtual scrapbook for multiple clippings.

schedulers such as System Agent, it reliably launches programs even if your PC is set to advanced power management. It has a host of other power features, such as the ability to run one program only after another runs.

LemmeSee, from Erik Askilrud (weberol.u.washington.edu/~redlense), is a \$5 shareware product that enhances the Windows common dialogs that most



AtomTime, by Bruce Adelman, keeps your PC's clock in sync with the world.



As the name implies, PowerDesk's ExplorerPlus does everything Explorer does and more.

Explorer file manager features, it also can be used as a plug-in replacement for Windows Explorer file management functions.

Using a standard Explorer-style interface, PowerDesk offers customizable menus to which you can add any application, customizable toolbars with optional drive icons, quick access to the Windows

Start Menu, a file finder, an optional DOS command line, file encryption, and built-in file-compression support. An optional viewer window uses the Quick View viewer already on your system or the Editors' Choice-winning Quick View Plus viewer (reviewed in "File-View Utilities").

There's no longer much of a market for toolbars that control Windows, but the well-designed toolbar in the PowerDesk package is by far the best. It can nestle into the Windows taskbar, float on the screen, or lock at any edge of the screen. In addition, you can access PowerDesk from a hotkey, and this product has full keyboard support for dozens of functions such as choosing a default printer. Mijenix is a small software company that's doing some big things in the areas of desktop enhancement and file compression. (ZipFolders, for instance, is reviewed in the following section.)

FILE COMPRESSION utilities

If you're finding it harder to fit files onto a floppy disk, or you're sending lots of attachments, get a .ZIP utility. BY DAVID HASKIN

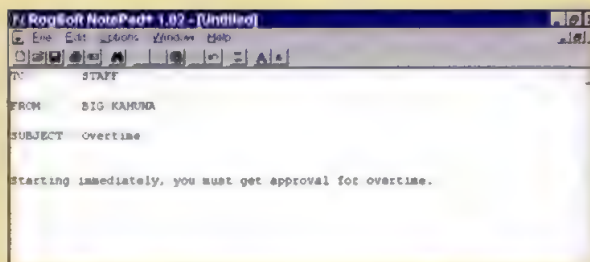
You'll find as many similarities as differences among these file compression programs. All of them let you compress selected files into .ZIP-compatible archive files and decompress them into whatever directories you choose. They also enable you to view the contents of compressed archives. In addition, the programs adhere to the so-called .ZIP standard, pioneered by the PKZip program, and most can decompress .TAR files. All provide multiple levels of compression, and we found only small variations in their compression ratios.

If you'd rather zip it and forget it, consider Mijenix Corp.'s innovative **ZipFolders 2.02** (\$30 list; 800-645-3649, 608-277-1981, www.mijenix.com), which employs

applications use to open and save files. With LemmeSee loaded, you can enlarge the standard dialogs to display more filenames. You also can choose a default view (large icon versus details) and default sort order. Microsoft Office applications use their own dialogs rather than the Windows ones, and LemmeSee has no effect on them.

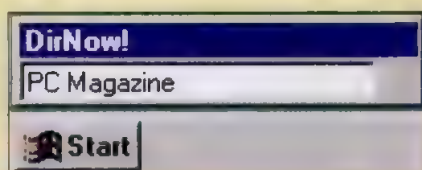
Microangelo, from Impact Software (www.impactsoft.com), is a suite of shareware utilities, ranging from \$25 to \$60 list, to help you organize your icons and cursors. One program lets you view and pull icons from executable files and place them in icon files or icon libraries. A second lets you organize libraries by moving icons from one to another. A wonderful icon editor even supports the new icon formats in Windows 95, and the program includes similar tools for cursors and animated cursors.

The free **Notepad+ 1.02**, from Rogier Meurs (lelystad.finet.nl/~0meurs01), replaces the Windows 95 Notepad and corrects some of that applet's most egre-



NotePad+ allows you to open multiple files simultaneously and removes the 64K file-size limit.

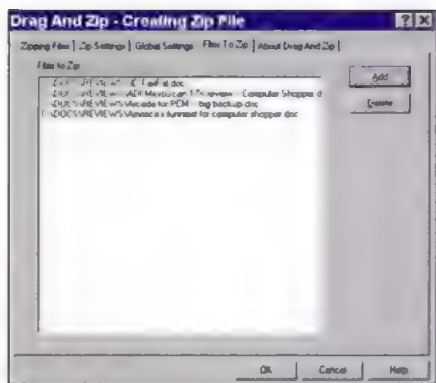
gious shortcomings. Now you can open multiple files at the same time, and they can be larger than 64K. You can send files via e-mail, and you can drag and drop text. Notepad Plus adds keyboard shortcuts not included in the original and, for convenience, has a handy toolbar, which includes icons for increasing and decreasing the size of on-screen fonts.



DirNow!'s tiny dialog box vanishes with a single keystroke.

Many utilities let you access the shortcuts on your desktop by clicking on an icon in the tray. This can be a major convenience when the desktop is obscured by program windows. SnadBoy Software's freeware **TopDesk** (www.snadboy.com) outdoes its rivals with options to hide all the icons cluttering your desktop and pop up TopDesk's menu with a hotkey.

Windows 95 is deficient in workstation security, but **WinU 3.10** can help. The utilities (\$30 list) from Bardon Data Systems (www.bardon.com) lets you create desks for individual users, each with its own launch buttons, appearance, and security. Each program itself can be password-protected, and you can specify a duration for programs and desks to remain open. A kiosk mode lets you further restrict access to programs, and logging options let you monitor usage.—David Haskin, Edward Mendelson, Neil Randall, and Barry Simon

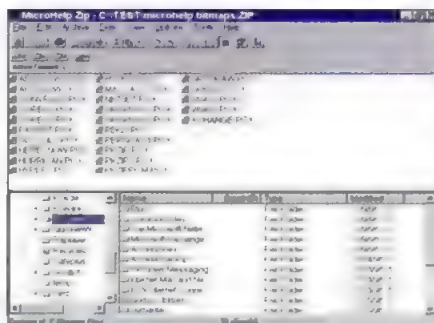


Drag And Zip's .ZIP creation windows allow you to set file details.

a device driver to compress and decompress files on the fly. But if you handle a lot of compressed files, you'll appreciate one of these full-blown utilities.

Version 1.31 of **Drag And Zip** (\$30 list; Canyon Software, 800-280-3691, 415-453-9779, www.canyonsw.com) is another likable program. It consists of two entirely separate interfaces—one for creating .ZIP files and the other for viewing them.

We found both interfaces pleasantly simple to use and also quite efficient. The .ZIP-creation dialog consists of a series of tabbed dialog boxes in which you set the details of the compressed file that you are creating. As the name implies, you can create



MicroHelp Zip mimics the Windows Explorer interface and file-maintenance features.

a compressed archive by dragging files from Windows Explorer to the creation module. The .ZIP-viewing utility enables you to keep multiple archives open at the same time. Then you can drag and drop files among the open archives.

MicroHelp Zip 1.01 (\$30 list; MicroHelp Inc., 800-922-3383, 770-516-0899, www.microhelp.com) presents the most familiar interface in the group. Its interface consists of two windows. The bottom window perfectly mimics Windows Explorer and supports the majority of that utility's file management capabilities. If you double-click on an archive file in the Explorer part of the interface, its content appears in the top window. To add a file to

an existing archive, you drag it from the Explorer window to the archive window.

MicroHelp Zip can perform both uuencoding and uudecoding, and it can decompress .TAR files, although it doesn't support MIME (Multipurpose Internet Mail Extension) files yet as Nico Mak Computing's WinZip does. You also can search for archives by name and for files within archives. You can't view multiple archive windows at the same time, however, and you can't add files from separate directories to a single archive in one operation unless you click on the files you want while simultaneously pressing the Ctrl button. You also can drag your archives files to the Windows 95 desktop so they can be decompressed automatically.

PKZip (\$49 list; PKWare Inc., 414-354-8699, www.pkware.com) set the standard for file compression utilities. Anybody who has wrestled with the arcane command-line parameters of this utility's DOS version knows, however, that PKWare has never been obsessed with usability.

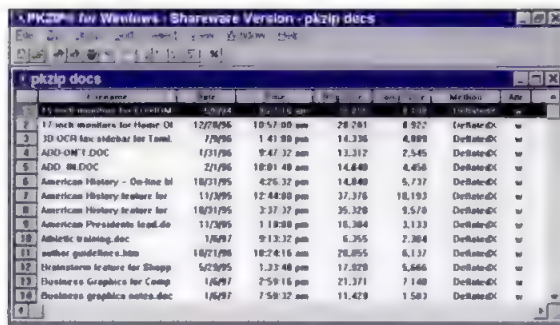
Still, PKZip is catching up with the other compression utilities. Version 2.5 for Windows finally supports Windows 95's long filenames.

Previously, it truncated the filenames to the standard 8.3 DOS naming convention. This caused constant confusion and frustration to Windows 95 users who thought they were compressing files with only one name.

PKZip for Windows is simple enough to use. You select the files you want to compress from as many folders as you wish and add them to a list. Then you click a button, and PKZip compresses the files. But PKZip for Windows doesn't support the .TAR format yet, and it doesn't have links to the Exchange client for quickly e-mailing compressed files. Still, if you want to

make sure your files adhere to the compression standard, PKZip for Windows is your program.

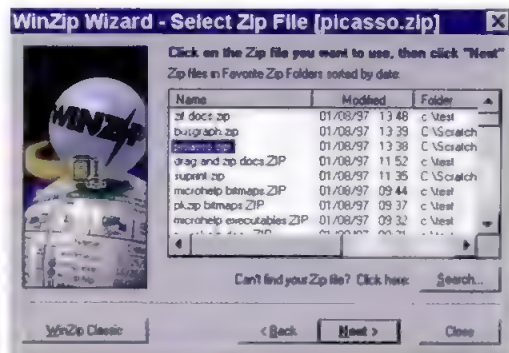
For a compression program that is easy to learn yet robust enough to satisfy power users, look no further than **WinZip 6.2** (\$29 list; Nico Mak Computing Inc., 800-242-4775, 713-524-6394, www.winzip.com). WinZip can perform uuencoding and uudecoding and also



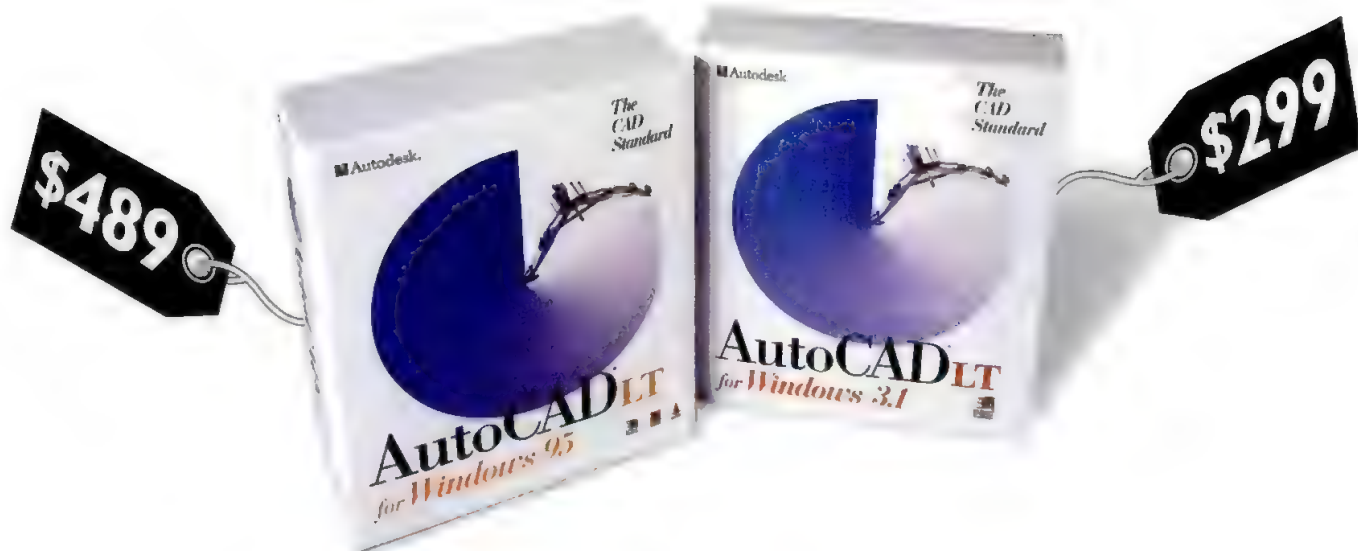
The creator of the compression category, PKZip now supports long filenames.

handles MIME and .TAR files. WinZip is the only product in the group with a wizard that simplifies compression tasks. Or you can compress or decompress files by dragging them between Windows Explorer and WinZip.

WinZip's unique Favorite Zip Folders list shows all compressed files in folders that you can designate. The program automatically adds folders that typically hold compressed files such as the downloaded subfolders for an America Online or CompuServe front end. Notably, though, WinZip lacks the ability to display multiple archive windows at the same time. This would enable you to move and copy files from one archive to another. Also, you can't archive files from multiple folders in a single step.



WinZip's wizard makes file compression a point-and-click process.



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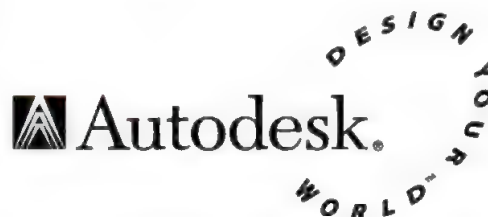
If you're not yet ready for the move to Windows 95, you can still reap the benefits of AutoCAD LT for Windows 3.1 (formerly known as AutoCAD LT Release 2) at a new low price. Based on AutoCAD R11 and R12.

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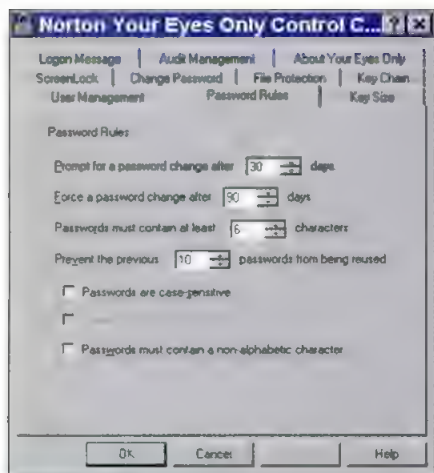
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DATA SECURITY utilities

Keep your valuable data under a virtual lock and key with these utilities. BY DAVID HASKIN

Whether your concern is a nosy colleague next door or protecting sensitive, mission-critical information, desktop security software helps ensure you won't be the victim of a cyber-snatching. Two products, Symantec Corp.'s Norton Your Eyes Only for Windows 95 and RSA Data Security's RSA SecurPC continue to lead



Your Eyes Only provides in-depth administration of passwords.

the PC-security pack. They are notable for their security features, transparent operation, and impressive speed. Encrypting and decrypting files take time, but on our 90-MHz Pentium test-bed with 16MB of RAM, these programs rarely took more than a second or two. We also looked at a new security program from McAfee Associates—PCCrypto 1.0.

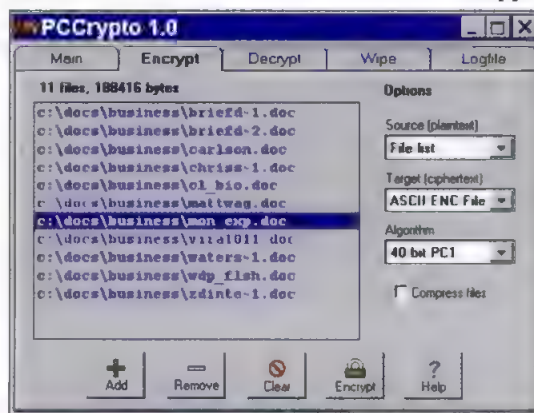
Norton Your Eyes Only for Windows 95 (\$90 street; Symantec Corp., 800-441-7234, 541-334-6054, www.symantec.com) requires a password when you start Windows 95. After that, it doesn't ask for your password again when accessing encrypted files. You can encrypt files either manually by selecting them in Windows Explorer or by designating specific SmartLock folders.

Your Eyes Only's ScreenLock screen saver requires your password before you can use your PC again. The BootLock feature also requires a password to start your system, but don't try to do this if you

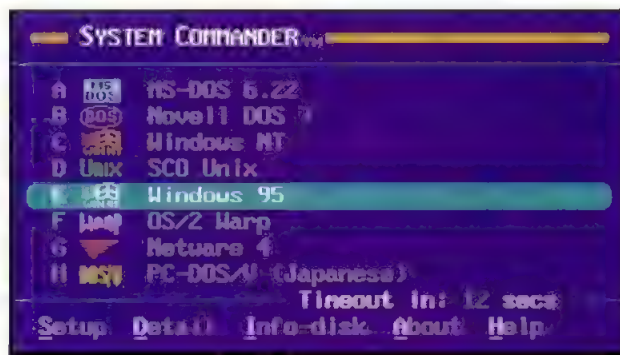
dual-boot with Windows NT. The program will prevent your access, as noted only in the accompanying README file.

Version 1.1 of RSA Data Security's **RSA SecurPC**, (\$129 list; 617-687-7000, www.rsa.com) doesn't provide as many extras as Your Eyes Only. Instead of requiring a password when you initially log on to Windows 95, it lets you create sets of files and folders that automatically decrypt as you boot up and encrypt as you shut down the system. You also have the option of encrypting and decrypting individual files manually. SecurPC can remember your password for a specified time. Another welcome feature is its ability to generate a secure, self-extracting file for sharing encrypted data with others even if they don't have SecurPC installed. You must give them your password, however.

The new kid on the block, **PCCrypto 1.0** (\$49 street; 800-332-9966, 408-988-3832, www.mcafee.com) also creates encrypted files and helps users transmit files over networks by compressing encrypted data. It can wipe out all traces of a file when you delete it. PCCrypto requires, though, that you take several steps to encrypt and decrypt sets of files, making it somewhat more complicated than its competitors. You'll become more likely to use a security program if it worked transparently, as is the case with Your Eyes Only and RSA SecurPC.



Encrypting and decrypting files with PCCrypto is more cumbersome than with competitors.



System Commander supports up to 100 operating systems on a single PC, including all native FAT-based systems.

MULTIBOOT utility

For the true power user, multiboot utilities let you run multiple operating systems. BY STEVE BUEHLER

If you want to run multiple operating systems on your PC, there's only one real choice: **System Commander**, Version 3.05, from V Communications (800-648-8266, 408-296-4224, www.v-com.com). This \$100 utility replaces a disk's Master Boot Record with its own, allowing you to install any combination of up to 100 operating systems on a single PC.

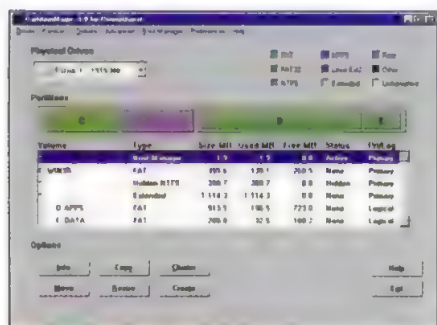
When you boot up, a System Commander menu lets you choose among the installed OSs, and it handles all native FAT-based systems including Windows 3.1, Windows 95, and Windows NT; DOS; FAT32; OS/2's HPFS; Windows NT's NFS; NetWare; and all Intel-based Unix file systems. PartitionMagic (reviewed in the following section) also includes a multiboot utility but does not support as many operating systems.

Use System Commander when you want to keep DOS for gaming and Windows 95 as your main desktop OS, or when you need to evaluate and compare several OSs. It's handy for demonstrating cross-platform software when you have minimal hardware. By keeping OS-specific configuration information in each OS's partition, it takes up less than 1MB on your system. System Commander also has a password option to protect your PC from unauthorized boot-up into any installed OS.

PARTITIONING utilities

Bigger is not always better when it comes to hard disk partitions and cluster sizes. BY STEVE BUEHLER

With large hard disks more affordable than ever, disk-partitioning tools are growing in importance. By managing the size of your partitions, you can reclaim 30 percent of the disk space lost to large clusters. The standard-bearer here is PowerQuest Corp.'s PartitionMagic, Version 3.01 (\$65 street), a utility that can modify, create, and delete partitions, as DOS's FDISK does. Quarterdeck Corp. has also entered the disk-partitioning market with Partition-It, Version 1.0, a \$50 utility that's a worthy competitor,



PartitionMagic makes it easy to slice and dice your hard disk to maximize space.

though it's targeted at a specific user group.

In addition to the standard FDISK functions, **PartitionMagic** (800-379-2566, 801-226-8977, www.powerquest.com) will modify partition sizes and locations quickly on your hard disk without completely destroying current information. It can create, move, and resize FAT, FAT32, NTFS, and HPFS partitions.

A new feature in PartitionMagic allows you to set up IBM's Boot Manager for selecting which OS to boot from at start-up. It also includes a DOS text version to resize disks on machines not running Windows.

With **Partition-It**, Quarterdeck (800-354-3222, 573-443-3282, www.quarterdeck.com) has aimed at the Windows user who wants an inexpensive partitioning tool—and has hit the mark. This product is a simple and easy-to-use tool without some of the niceties of PartitionMagic such as a boot manager. Although it modifies FAT16 and FAT32 partitions, it does not

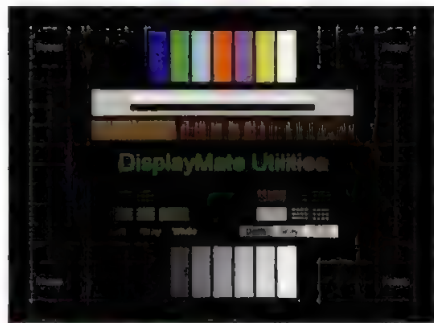
work on HPFS, NTFS, or other partition types. It's well suited for Windows users who want careful hard disk management without getting too complex.

DISPLAY utilities

Image is everything, and DisplayMate is a monitor utility that can help you get yours just right. BY JAMIE BSALES

The most looked-at component of your PC—the monitor—is often the most overlooked. Users live with ghosting, poor focus, improper screen geometry, and other flaws, rarely venturing to do more than adjust the display's brightness and contrast. Enter the \$79 **DisplayMate for Windows**, from Sonera Technologies (800-932-6323, 908-747-6886, www.displaymate.com). This handy utility helps you set up and fine-tune your monitor for optimum image quality, and it's a great tool for those who want to evaluate and compare displays before they buy.

DisplayMate for Windows works under Windows 3.x, Windows 95, Windows NT, and OS/2. It delivers expert information on what shortcomings to look for and what adjustments you can make (depending on the



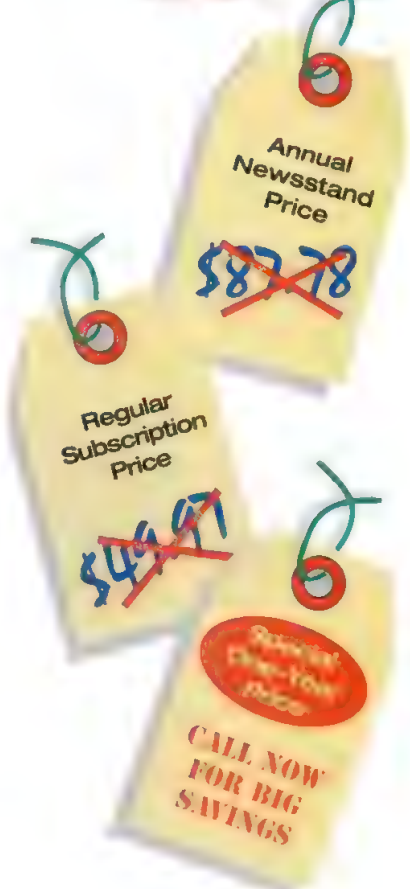
DisplayMate's main test pattern can reveal flaws in your monitor's image quality.

controls your monitor offers) to correct them. But monitor test patterns are its real claim to fame. A range of color and black-and-white screen images let you evaluate a monitor's linearity, focus, color quality, and color sensitivity, among other attributes.

For IS professionals and advanced users, **DisplayMate Professional** (\$249 list) is a full-fledged diagnostic utility that probes the display subsystem—monitor, graphics card, and video BIOS—and reports on compatibility status, scan rates, timings, and more. □



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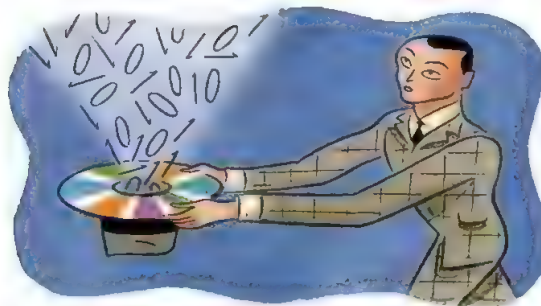


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NETWORK backup

Today's networks don't use just a single network operating system.

These four storage management systems for NetWare and Windows

NT Server cover your backup bases. *By Steve Rigney*

For a network administrator, nothing is as scary as losing a file or crashing a hard disk. And nothing is as rewarding as having a solid backup solution in place and restoring your data; it feels as if you've cheated death. But you can't get the reward without having the right storage management software in place. Today, the gentle intrusion of Windows NT and other operating systems into NetWare networks means that backup software must run in several environments to meet your needs.

In this roundup, we look at four time-tested storage management packages that you can trust to back up and restore Windows NT and NetWare servers: Cheyenne's ARCserve, Legato Systems' NetWorker, Seagate Backup Exec, and Seagate Storage Manager. We look at Stac's Replica in a sidebar, because the company's Windows NT version was not yet available. Each of these products will store all of your server data—including NetWare's Novell Directory Services (NDS) database and the Windows NT Server Registry—on an external backup device, usually a tape drive. Though you can use other storage media with these products, tape is the most cost-effective and portable backup medium (see the sidebar "Tape Backup Drives").

If you need a backup scheme for around-the-clock uptime, you should consider higher-end *fault-tolerant* solutions, such as Nov-

ell's NetWare SFT III or Vinca Corp.'s Standby-Server. These provide a mirrored secondary server that can immediately come online in the event that your primary server fails.

Vendors of network backup products have seen some radical changes recently. Cheyenne Software is now a division of Computer Associates. Seagate's two product lines in this roundup are the result of the company's acquisition last year of Arcada, the makers of Backup Exec, and Palindrome, which developed Storage Manager.

COST AND VALUE

Both Windows NT Server and NetWare include backup utilities, but these are very basic programs that lack the advanced features of the products here. Windows NT's backup program is actually a scaled-down version of Seagate Backup Exec for Windows NT that does not let you schedule an unattended backup or restore session. Novell's Storage Management Services (SMS) is a more complex storage engine built into NetWare. Novell provides a NetWare Loadable Module (NLM) called Sbackup, which uses SMS for basic backup and restore functions. But

like Windows NT's backup program, Sbackup is not as sophisticated a system as those we review.

IBM's OS/2 Warp Server includes a more full-featured backup



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utility than those that come with Windows NT or NetWare, with scheduling and disaster recovery features. If you're running primarily OS/2 servers, you'll probably want to use the integrated utility for backup: None of the vendors in this roundup provides a network version of its software for OS/2 Warp Server, though Cheyenne and Seagate sell standalone OS/2 backup products, and each vendor in this roundup offers an OS/2 client backup agent.

If you've got a multiserver environment, you'll probably want the enterprise edition of any of these products. The versions for NetWare generally carry bigger prices than those for Windows NT, but for either platform you may have to buy optional client backup agents or modules for database backup (see our Summary of Features). Depending on your needs, you may also decide to back up other servers using agents. For example, if you have just one Windows NT server in a primarily NetWare network, you might choose to back it up via an agent to a NetWare server.

WHAT WE FOUND

During testing we looked at different dimensions of storage management software flexibility, including interoperability, scheduling, management, and configuration during installation. We also compared the products' backup-and-restore speeds (see the test results on the next page), but in selecting a backup solution you should consider the product's range of features and options ahead of performance differences. Each of these solutions will perform

Editors' Choice

• ARCserve 6 for NetWare and Windows NT



Of the products reviewed, Cheyenne's ARCserve provides the most extensive and flexible network backup solution for multiserver environments.

ARCserve offers a host of options such as virus protection, hierarchical storage management, and agents for almost every operating system on the market. Both NetWare and Windows NT versions of ARCserve are very easy to set up, and the management utility interfaces between them are similar. The only drawback of the package is that you must use the NetWare utility to

manage NetWare servers and the Windows NT utility to manage Windows NT servers.

The other products we reviewed have their own strengths. Legato's NetWorker and Seagate Storage Manager were not as easy to set up and use as ARCserve, but both of these solutions provide a wide assortment of options for higher-end management needs. Seagate Backup Exec is easy to use but is better for single-server backup.

adequately in a real-world network.

Interoperability among backup tape media formats has always been a problem. Although each of the vendors in this roundup still uses a proprietary tape format, there are now some common backup formats that provide some interoperability. Novell led the drive for a common tape format, called the System Independent Data Format (SIDF). Microsoft responded with the Microsoft Tape Format (MTF), and now we have two tape "standards." For networks with multiple operating systems, interoperability also means integrating into your existing environment and making different versions of the product work together. For instance, the Windows NT and NetWare versions of

ARCserve are very similar, so there are few training or handling differences.

Automation is an important attribute of flexible network backup software. ARCserve's push agents automate and accelerate backups from client PCs. Seagate Storage Manager provides excellent guidance on tape rotation and selection so that even a less experienced employee can initiate a backup session.

Though you'll spend most of your time working with the backup side of these products, the restore functions are just as important. The products here each offer advanced features for restoring a file. For example, you can schedule a restore and keep a database or log of which files were restored and when.

NETWORK BACKUP

How to Read the Suitability to Task Boxes

We evaluate the **installation and configuration** procedure for each product. Superior products check for outdated operating system components and automatically detect backup devices. We expect products to allow configuration of multiple tape drives for simultaneous backup and restore sessions. The NetWare version of the product should work with NDS, and the product's management utility should snap into the NWAdmin utility. We prefer products that do not require specific server setups or network protocols.

For **scheduling and management** we evaluate each product's backup techniques, tape rotation

features, and reporting abilities. We look for essential tools that monitor active and pending jobs, and generate alerts and logs. Management tools should have an intuitive interface for simple navigation and file tagging. We like disaster recovery utilities that don't require you to reinstall

the operating system, and we consider any fault-tolerant schemes.

The **interoperability** rating is a measure of each vendor's ability to blend management of its NetWare and Windows NT Server platforms. It also reflects the completeness of client backup agents. We look for common administrative consoles and the ability to read tape formats across each platform. We give higher ratings to products that can use multiple network protocols and SIDF and MTF tape formats. Extensive solutions provide a complete range of database and messaging platform backup modules.

SUITABILITY TO TASK

Product Name

Installation and configuration	Excellent
Scheduling and management	Good
Interoperability	Fair

BENCHMARK TESTS

Network Backup



Any of these products will perform adequately for backup and restore tasks. On our Restore tests, Seagate Backup Exec topped the Windows NT group, while ARCserve was speediest performer in the NetWare group.

What the Numbers Mean

Seagate Backup Exec easily outpaced the competition on our Backup test for both NetWare or Windows NT servers. Backup Exec's top performance is not due to superior write-to-tape technology; rather, it's the result of the product's faster verification technique. For all products we reviewed, the verify procedure confirms that data is written correctly during a backup session by comparing the tape's contents to the server's data. Backup Exec uses the faster Cyclic Redundancy Check (CRC) technique, which compares characters created during the backup on the tape to corresponding characters on the disk. By contrast, the other products each use a compare-tape-to-disk method, which consumes more overhead by comparing each file on tape against each file on disk.

Verification proved the differentiating factor on backup. Additional testing without verification enabled (not reported) showed that while Backup Exec was still the fastest product, the results were much closer. In any case, despite the appeal of comparing these products based on backup time, most backup jobs do not frequently move amounts of data as large as the data set used during testing. Each of the products reviewed includes tape-rotation schemes that call for incremental backup of only changed data.

Restoring files is typically more time-sensitive than backup, as an administrator may be recovering from a major hardware failure or retrieving vital data that a user has accidentally deleted. All the products turned in good scores on our Restore test, searching through the directory structure of the whole data set to retrieve

selected data. Any one of these products is sufficient for recalling files efficiently. For NetWare, ARCserve delivered top results at a little over 2 minutes, followed by Backup Exec, NetWorker, and Storage Manager (slowest at almost 9 minutes). For Windows NT, Backup Exec finished in less than 3 minutes, followed by ARCserve and NetWorker, with Storage Manager again placing last. Cheyenne says ARCserve's superior performance results from using ARCserve's own drivers, optimized for tape devices, instead of those supplied with the operating system.

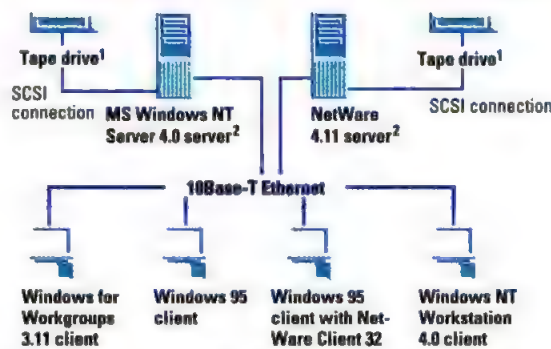
System administrators should base their buying decision first on factors unrelated to performance—such as management and platform support—and look to hardware for better backup performance. Our tests used a digital linear tape (DLT) drive for the best possible performance. All of these backup products allow *parallelism* (simultaneous backup and restores). Parallelism lets multiple devices run concurrently, which increases throughput and can provide redundancy. Furthermore, in multi-server and client backup scenarios, where data must travel over wire, the network can become a bottleneck. Data moves more efficiently over a network with optimized segmentation or with a higher-bandwidth technology, such as Fast Ethernet.—*Analysis written by Jeffrey G. Witt*

How We Tested

We performed backups and selective restores using a data set that contained a mix of application, text, spreadsheet, graphics, and database files. The data size for our **Backup** test totaled 890MB; of these files, we chose a subset for the **Restore** test that totaled 72MB. The scores reflect the time between the point when we submit a job and when the application reports the job's completion. We performed all Backup tests with the product's verification feature enabled, so those scores include tape verification time. Before each test, we rebooted the server and ejected the tape to eliminate any possible caching.

We used two HP NetServer LF 5/66 servers to test each product with NetWare 4.11 and Microsoft

Windows NT Server 4.0. Each server's first 1GB drive contained the operating system, and we configured the remaining three 1GB drives into a single volume for the data set using default block sizes and formatted with the OS's default file system. We enabled data compression on the tape drive for the best possible throughput.



(1) HP SureStore DLT40e (2) HP NetServer LF 5/66 with 64MB RAM, four 1GB hard disks, an Adaptec 7770 SCSI-2 controller, and an Intel EtherExpress PRO/100B adapter

TEST-BED: Network backup.

Bold type denotes first place within each category.

Minutes:seconds

	Backup	Restore
NETWARE 4.11		
ARCserve for NetWare	36:47	2:41
NetWorker for NetWare	58:24	6:34
Seagate Backup Exec for NetWare	19:20	4:18
Seagate Storage Manager for NetWare	58:31	8:55
WINDOWS NT SERVER 4.0		
ARCserve for Windows NT	39:12	4:23
NetWorker for Windows NT	49:22	6:39
Seagate Backup Exec for Windows NT	22:35	2:59
Seagate Storage Manager for Windows NT	36:45	9:38

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Virus Bulletin, comparative NT review, 10/96

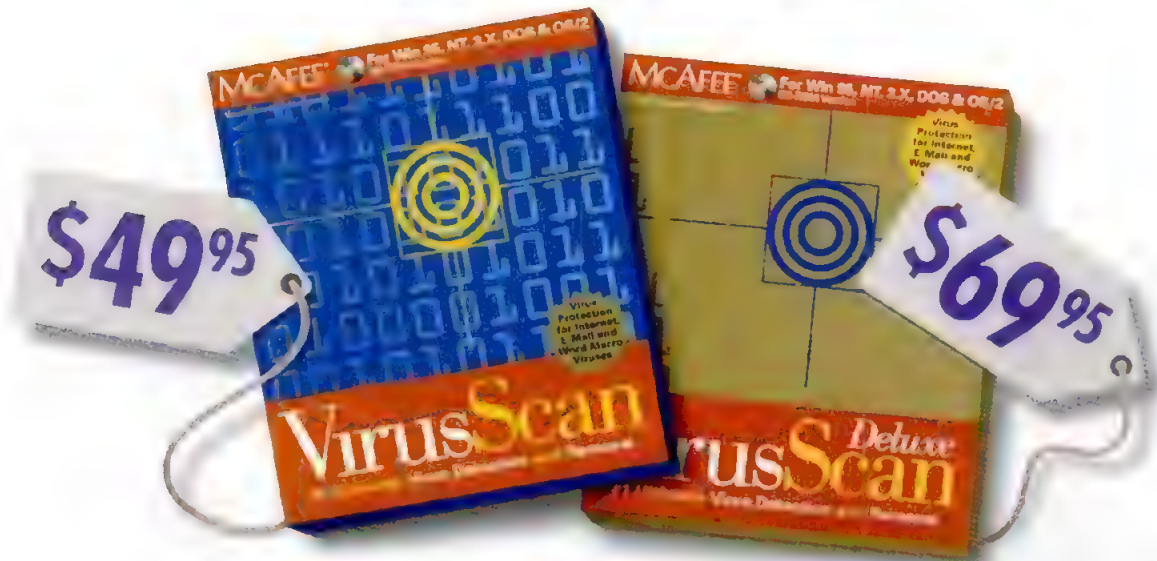


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*Test results based on Alwil technology and McAfee-Hunter engine. ** Prices shown are estimated street prices and may vary at your local retailers. †Worldwide anti-virus market share. Standalone DOS, Windows and OS2 shipments — IDC, 1994
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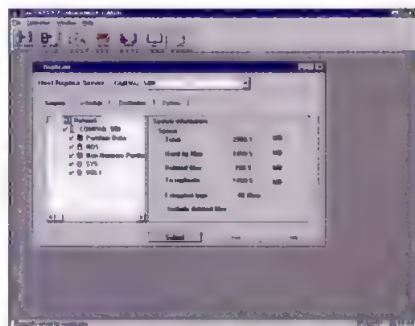
Stac's Replica: Basic Backup

By Steve Rigney

We didn't include Stac's Replica 3.0 in our roundup because only the NetWare version was available. The Windows NT version of the product was in beta at the time of our testing. But Replica also differs in some significant ways: Unlike the other products we reviewed, which back up data file by file, Replica makes a complete mirror image of your NetWare file server volumes. Replica doesn't allow you to back up single files or directories (though you can restore files individually). And, though it lacks the bells and whistles of the other solutions in our roundup—such as support for tape rotation schemes, notification, and client backup agents—Replica is easier to install and use. If you just need a quick and simple backup utility for NetWare, you'll want to consider it.

Replica for NetWare is available in three versions: Backup (free to download from Stac's Web site), Single Server (\$499), and Intranet-

work (\$899). The only feature in the Single Server version that isn't included in the free version is Replica's great disaster-recovery option. To that, the Intranetwork version



Replica provides a simple menu for choosing which volumes to copy.

adds the ability to replicate multiple servers and remote servers, and work with DLT devices. Replica allows you to create copies of your volumes on a tape device, another NetWare server, or a different volume on the same server. In fact, your backup media device becomes itself a NetWare volume that you can mount and map

a drive letter to. This means that you don't need any special restore software to recover lost files; any NetWare client can retrieve data directly from the Replica tape. Because Replica doesn't have to open or close files when it runs, it is usually faster than normal backup solutions.

One of the best features of Replica is its disaster-recovery option. Replica automatically creates two or three disaster-recovery disks (depending on your configuration) that contain everything you need to salvage your data in the event of a hard disk failure. Of the products in our roundup, only ARCserve provides a similar option.

A feature new in Replica 3.0 is Stac Internet Central, which contacts Stac's site to update your configuration and lets you download it at that time. You also can disable this feature or change the frequency of the connections.

Replica for NetWare 3.0. List price: Single Server version, \$499. Stac Inc., San Diego, CA; 800-279-7822, 619-794-4300; www.stac.com. *Circle 451 on reader service card.*

Cheyenne Software, a division of Computer Associates Inc.

ARCserve for NetWare, ARCserve for Windows NT



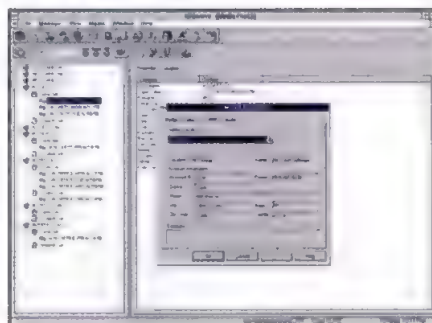
Options, options, and more options is the name of the game for Cheyenne Software's ARCserve 6.0, our Editors' Choice for network backup.

With options such as disaster recovery, virus protection, hierarchical storage management (HSM), RAID, and agents for almost every desktop and server operating system on the market, ARCserve is the most flexible product in our roundup. The enterprise versions of ARCserve sell for \$1,895 for NetWare and \$1,395 for Windows NT. Most of the options are sold separately, but it costs more to buy them that way.

Both NetWare and Windows NT versions have an intuitive graphical installation utility, and their administration utilities look similar. The NetWare installation

checks the current versions of your NLMs and lets you know if a required driver didn't load. The NetWare version also offers Online Cue Cards that assist you with configuration, a helpful feature that's missing from the Windows NT version.

The ARCserve administrative console allows you to set up backup and restore jobs and create sets of available media very easily. The media pool management database allows you to keep track of all of



ARCserve allows you to view all your backup media and group them in logical sets.

your tapes. The administrative console also allows you to centrally manage and monitor multiple servers running ARCserve. Unfortunately, only the Windows NT version can manage ARCserve for Windows NT, and only the NetWare version can control NetWare servers. Like the other products in our roundup, ARCserve uses its own tape format, but it was the only product we reviewed that can read both MTF and SIDF tape formats.

ARCserve provides *push agents*, a clever technology that makes it easier to back up your client PCs. Rather than the server requesting data from the network clients, the client agents automatically send the data in ARCserve format, which provides increased performance and reduces the load on your storage management server. Of the other products, only the NetWare version of Seagate Backup Exec provides push clients.

Unlike the other products here, ARCserve includes a disaster-recovery option.

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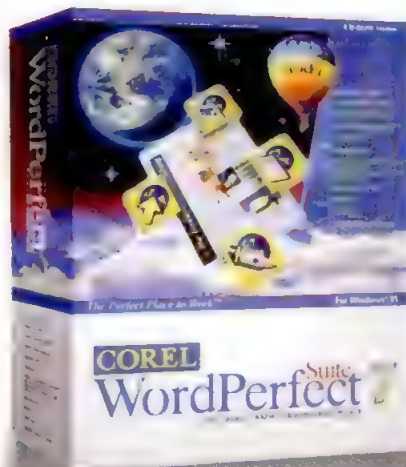
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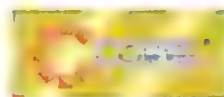
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Tape Backup Drives

By Padraic Boyle

For any of the products in our roundup, you'll need to use backup devices that are right for your network. Tape backup drives provide a diverse range of options, capable of handling everything from single-PC backup to large corporate server rooms. DAT (digital audio tape) and QIC (quarter-inch cartridge) are affordable tape technologies that have been around for a while and are fairly well entrenched in small-business markets. The Travan TR-4 format can store 4GB and the DDS-3 format can store 12GB. DAT and QIC provide between 300-KBps

and 1.5-MBps throughput.

One of the latest technologies to hit the market is DLT (digital linear tape). With the highest capacity (up to 35GB) and throughput (up to 5 MBps), DLT is best for large networks and mainframe environments. But DLT's capacity and speed come at a price, making it too costly for many small and medium installations. Moreover, DLT is not compatible with any other tape format.

New 8-mm drives from Sony and Exabyte are encroaching on DLT's market by increasing their native capacity to as much as 25GB per tape. As with DLT, 8-mm is much

more expensive per drive than DAT or QIC. Both drives offer high storage capacities but with slightly slower throughput (3 MBps) compared with DLT throughput. Exabyte's Mammoth provides compatibility with existing 8-mm formats, while Sony's Advanced Intelligent Tape (AIT) is not compatible with older formats.

Other technologies finding their places in the backup arena are optical disks (CD-R and DVD), magneto-optical disks, and floptical disks. These technologies are being used in archiving schemes for long-term data storage.

For Windows NT, ARCserve creates one or more disks that allow you to boot up your server and begin restoring backed-up files. Similarly, ARCserve's NetWare option creates a set of disks that will load essential NetWare files and allow you to

Legato Systems Inc.

NetWorker for NetWare, NetWorker for Windows NT

Though they are not easy to install and require you to use TCP/IP for some management configurations, Legato's versions of NetWorker for Windows NT and Novell NetWare may still be good choices for large, heterogeneous networks that use TCP/IP. Two of the product's best selling points are NetWorker's ability to manage any server from any client and Legato's wide support for Unix platforms.

The Windows NT and NetWare editions of NetWorker retail for \$2,000 each. Like ARCserve, though, the list price doesn't include any software agents. If you want to back up your network clients you'll have to shell out \$1,500 for a client pack. The client software covers DOS, Windows 3.x, and OS/2, as well as a Unix, NetWare, Windows NT Workstation, and Macintosh. NetWorker is also available for multiple Unix server flavors, including IBM AIX, HP-UX, SCO Unix, and Sun Solaris.

The product's manual was a bit confusing, but the quick-start guide provided the correct procedures. You can install the NetWare version from the file server console or across the network from a client PC. The NetWare console install is character-based and may require you to edit your network configuration files. The graphical Windows NT server installation was easier but also required manual configuration when we set

up the management console on the server.

Besides its fair installation, NetWorker's other problem is its reliance on TCP/IP protocol for certain agents and client PCs. Obviously, this requirement will not be an obstacle for networks that have standardized on TCP/IP. For NetWare shops, though, it might present difficulties. For example, to use the Windows 95 administration tool to manage NetWorker running on a NetWare server, you must use the TCP/IP network protocol. To its credit, NetWorker is the only product



NetWorker lets you view storage jobs and information about your servers.

here that includes the ability to manage and monitor all of its different server versions from a single network client. (Seagate offers this feature for both its product lines as a separately sold option.)

NetWorker lets you use the client packs to back up and restore files on your local hard disks across the network. The Net-

SUITABILITY TO TASK

ARCserve 6 for NetWare and Windows NT

Installation and configuration	Excellent
Scheduling and management	Excellent
Interoperability	Good

recover data immediately.

If you have a database on your network, you will appreciate ARCserve's database-protection options. Using ARCserve for Windows NT you can back up your Exchange, SQL Server, Oracle, and Notes servers. The NetWare version offers options for Sybase and Oracle servers, among others. Both versions provide client agents for all flavors of Windows, Macintosh, OS/2, and Unix; the NetWare product provides DOS clients, too. For Unix servers, Cheyenne provides ARCserve/Open for Solaris, HP-UX, and other platforms.

ARCserve 6.0 for NetWare. List price: Enterprise Edition, \$1,895. **ARCserve 6.0 for Windows NT.** List price: Enterprise Edition, \$1,395. Cheyenne Software, a division of Computer Associates Inc., Roslyn Heights, NY; 800-243-9462, 516-465-4000; www.cheyenne.com. Circle 448 on reader service card.

SUITABILITY TO TASK

NetWorker for NetWare and Windows NT

Installation and configuration	Fair
Scheduling and management	Good
Interoperability	Good

Worker user utility is intuitive and allows you to select individual files or entire disks for backup or restore. Unfortunately, as with the management utility, the client backup agents sometimes require TCP/IP.

Notification is one of NetWorker's strong suits. You can customize different levels of alerts in case an error occurs. For example, if a tape needs to be replaced, NetWorker can send out a basic e-mail message to the administrator, using either MHS or MAPI mail systems. You can also configure it to send another broadcast or e-mail if the problem is not solved in a predetermined amount of time.

Unlike the other products here, NetWorker doesn't include a canned set of tape rotation schemes, but it does let you set up your own tape rotation rules. Like Seagate Storage Manager, almost all of the features are equal in both the Windows NT and NetWare versions. Legato, like Cheyenne, also offers optional modules for SNMP, HSM, and database management.

NetWorker 4.1 for NetWare. List price: \$2,000.

NetWorker 4.3 for Windows NT. List price: \$2,000. Legato Systems Inc., Palo Alto, CA; 415-812-6000; www.legato.com. *Circle 449 on reader service card.*

Seagate Software Inc.

**Seagate Backup Exec for NetWare,
Seagate Backup Exec for NT**

Both Seagate Backup Exec for NetWare 7.11d (Enterprise Edition, \$1,395) and Windows NT 6.11 (Enterprise Edition, \$1,295) maintain the easy-to-use user interface and dependable performance that many have come to rely on. While either version of Backup Exec will give you a good single-server backup solution, the Windows NT version lacks some of the attractive features of its NetWare counterpart.

If your network is mostly NetWare-based with a diverse mix of clients, then Backup Exec for NetWare is the product you will want. With its add-on modules for Microsoft SQL Server and Exchange, the NetWare version of Backup

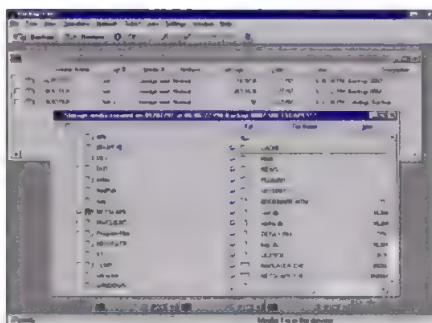
SUMMARY OF FEATURES

Network Backup



	ARCserve for NetWare and Windows NT	NetWorker for NetWare and Windows NT	Seagate Backup Exec for NetWare and Windows NT	Seagate Storage Manager for NetWare and Windows NT
■ YES ■ NO □ OPTIONAL				
Products listed in alphabetical order				
List price: NetWare/Windows NT	\$1,895, \$1,395	\$2,000, \$2,000	\$1,395, \$1,295	\$3,595, \$3,595
Server operating systems supported:				
Microsoft Windows NT Server 3.51/4.0	■ ■	■ ■	■ ■	■ ■
NetWare 3.x/4.x	■ ■	■ ■	■ ■	■ ■
Unix	■	■	■	■
Client backup agents included for:				
DOS/Windows 3.x	■ ¹ ■	■ ■	■ ■	■ ■
Windows 95/Windows NT Workstation	■ ■ ²	■ ■ ²	■ ■ ¹	■ ■
Macintosh/OS/2/Unix	□ ■ ³ □	□ □ □	■ ³ ■ ³	■ ■ ■
Client agents are push agents	■	■	■ ¹	■
Server agents available for:				
Lotus Notes/Microsoft Exchange Server	■ ⁴ ■ ⁴	■ ■	■ ■	■ □
Microsoft SQL Server/Oracle7	■ ⁴ ■	■ ■	■ ■ ¹	□ □
Administrator can allow users to restore files	■	■	■ ¹	■
Supports long filenames	■	■	■	■
Simultaneous multihost backup to single tape drive	■ ¹	■	■	■
Simultaneous multiple-device backup/restore	■ ■	■ ■	■ ■	■ ■
Can back up Novell's NDS database	■	■	■	■
Can back up Windows NT Server Registry	■	■	■	■
Disaster recovery/RAID/Virus scanning	□ □ □	■ ■ ■	■ ■ ■	■ ■ ■
Uses own drivers/operating systems' drivers	■ ■	■ ¹ ■ ⁴	■ ■ ⁴	■ ■
Supports 4-mm/8-mm DAT drives	■ ■	■ ■	■ ■	■ ■
Supports DLT/auto-loader devices	■ □	■ □	■ □	■ □
Reads SIF/Microsoft Tape Format (MTF)	■ ¹ ■ ⁴	■ ■	■ ■	■ ■
Provides GFS/Tower of Hanoi tape rotations	■ ■	■ ■	■ ⁴ ■	■ ■
Provides custom tape rotations	■	■	■ ¹	■
Can span multiple tapes with the same data	■	■	■ ⁴	■

(1) NetWare version only. (2) Optional for NetWare version, supported for Windows NT version.
(3) Supported for NetWare version, optional for Windows NT version. (4) Windows NT version only.



Seagate Backup Exec makes it easy to restore files, directories, or entire drives.

Exec can handle all of your backup needs.

Seagate also sells Storage Manager, another multiplatform network backup package that we review in this roundup. Backup Exec is positioned as the more mainstream product, and it's easier to use. Storage Manager provides support for

higher-end features such as hierarchical storage management (HSM). Unlike the products from Cheyenne and Legato, however, neither of the Seagate product lines offers native versions for Unix servers.

Installing both the NetWare and Windows NT versions of Backup Exec was extremely easy. Like its previous release, the NetWare version still installs from your NetWare server. You can create backup and restore jobs from the NetWare console or from the Windows-based user interface. We recommend using the Windows program to administer your backup servers, although it lacks context-sensitive help. You can administer multiple* homogeneous backup servers from the Windows client, but you can't monitor both NetWare and Windows NT backup servers from one client unless you purchase Exec View (\$1,395



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Network Backup

SUITABILITY TO TASK

Seagate Backup Exec for NetWare and Windows NT

Installation and configuration	Excellent
Scheduling and management	Good
Interoperability	Fair

for a five-server license) from Seagate.

One noticeable difference between the NetWare and Windows NT versions of Backup Exec is in the client agents that each includes. The NetWare clients, such as ARCserve's client backup agents, use a push technique, in which the client efficiently sends data to be backed up to the server (instead of the server requesting the data from the client agent). Currently, the Windows NT client backup agents do not use the same technique, though Seagate says it will add this feature in a later release. Both versions of Backup Exec include agents for DOS, Windows 3.x, Windows 95, and Windows NT Workstation; the NetWare version also bundles Macintosh, Unix, and additional NetWare server agents, which are sold separately for the Windows NT version.

A feature in the NetWare version that is not in the Windows NT version is the ability to send a backup job to the first available tape device. Seagate says future Windows NT versions will include this feature, but for now Windows NT jobs must be targeted to specific devices. If there are any problems with a backup or restore job, both versions can notify you via e-mail.

Additional agents and modules are available to back up some popular databases. For NetWare, you can purchase the Oracle agent to back up your database without interrupting normal operations. This allows you to make up-to-the-minute copies of all data files, including active ones. There are two optional modules available for the Windows NT version: Microsoft SQL Server 6.0 and Exchange Server. Both modules allow you to back up your SQL and Exchange databases—including the transaction logs—while they're still active.

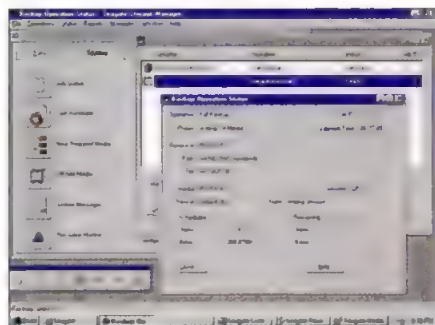
Seagate Backup Exec 7.11 for NetWare. List price: Enterprise Edition, \$1,395. **Seagate Backup Exec 6.11 for NT.** List price: Enterprise Edition, \$1,295. Seagate Software Inc., Heathrow, FL; 800-327-2232, 407-531-7500; www.smg.seagatesoftware.com. *Circle 450 on reader service card.*

Seagate Software Inc.

Seagate Storage Manager for NetWare, Seagate Storage Manager for Windows NT

Unlike in Seagate's other backup offering, Backup Exec, there is little difference in the feature sets or functions between the NetWare and NT versions of Seagate Storage Manager (\$3,595 for unlimited multiserver version). These two versions of Storage Manager—which Seagate will soon begin calling Storage Exec—include some of the most powerful backup utilities available, offering excellent tape management features.

Both NetWare and Windows NT versions come with client agents for DOS, Windows 3.x, Windows 95, Windows NT Workstation, OS/2, Macintosh, and Unix. But what you gain in power you sacrifice in ease of use: While the user interface is functional, it isn't as intuitive or as easy to navigate as Backup Exec's. Though a



Seagate Storage Manager lets you monitor backup status in real time.

good choice for large installations, Seagate Storage Manager may be overkill for many small- to medium-size LANs.

Storage Manager's installation routine for both NetWare and NT requires you "prepare" the server before you can begin installing the program. The preparation process automatically copies new NLMs to a NetWare server (and DLLs and other files on Windows NT) to ensure that they are the versions compatible with Storage Manager. As soon as installation was complete, we were prompted to start a full backup.

The Control Panel is the heart and soul of Storage Manager. From here you can start a backup or restore session, check the status of your media, or run the Resource Manager to modify your drives and volumes. This version of Storage Manager also makes it easier to back up

a single directory or file than previous versions. From the File Manager, you can select the files, directories, or volumes to back up. Seagate also sells separately Visual Storage Administrator (VISTA), a Windows program originally developed by Palindrome. VISTA starts at \$795. Unlike the Control Panel applet, VISTA lets you monitor multiple Storage Manager servers.

Storage Manager truly excels in tape management. In addition to creating a single backup event, Storage Manager can handle popular tape-rotation schemes such as Grandfather-Father-Son (GFS) and Tower of Hanoi. Storage Manager alerts you to load the proper tape and can keep track of tapes kept off site. Like ARCserve, Storage Manager also offers HSM; in fact, HSM is bundled in Storage Manager, whereas it's an optional product for ARCserve.

Using Automatic Recall (a NetWare-only feature) when you request a file that has been migrated, the system will attempt to retrieve the file from the backup media. If there is a delay in accessing the file, the user receives a message that the file is being retrieved and is offered a choice to wait for the file or cancel the request. Seagate says Auto Recall will be available in the next release for NT. Both versions of Storage Manager can route a backup job to any available device for an added measure of redundancy in the event of a tape drive failure. Like Backup Exec, Seagate Storage Manager offers server agents to back up Microsoft Exchange, SQL Server 6.0 and Oracle for NT for \$995 each. All of the client agents, though, are bundled with the products. □

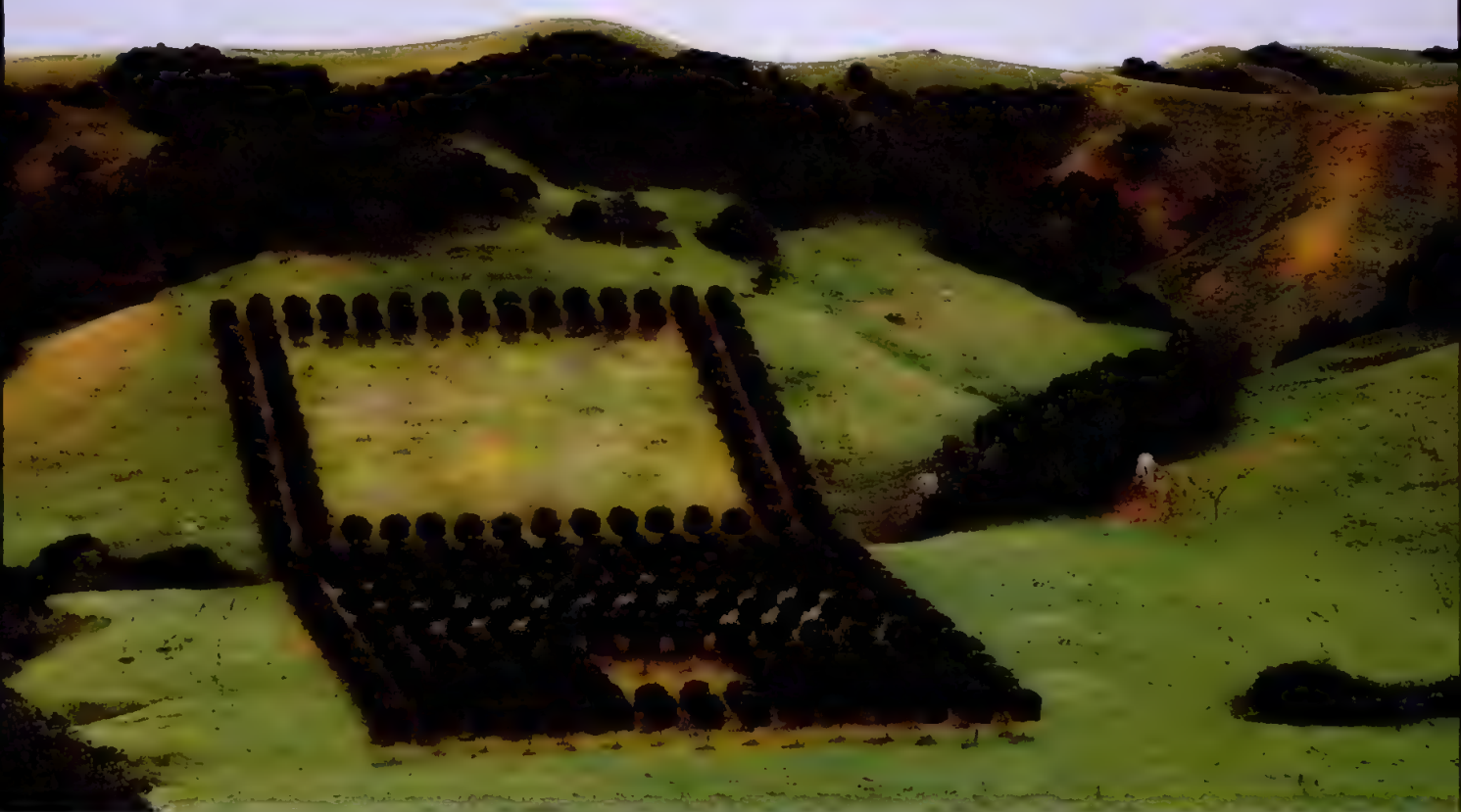
Seagate Storage Manager 4.11 for NetWare. List price: Unlimited multiserver version, \$3,595. **Seagate Storage Manager 4.0e for NT.** List price: Unlimited multiserver version, \$3,595. Seagate Software Inc., Heathrow, FL; 800-327-2232, 407-531-7500; www.smg.seagatesoftware.com. *Circle 450 on reader service card.*

SUITABILITY TO TASK

Seagate Storage Manager for NetWare and Windows NT

Installation and configuration	Fair
Scheduling and management	Good
Interoperability	Good

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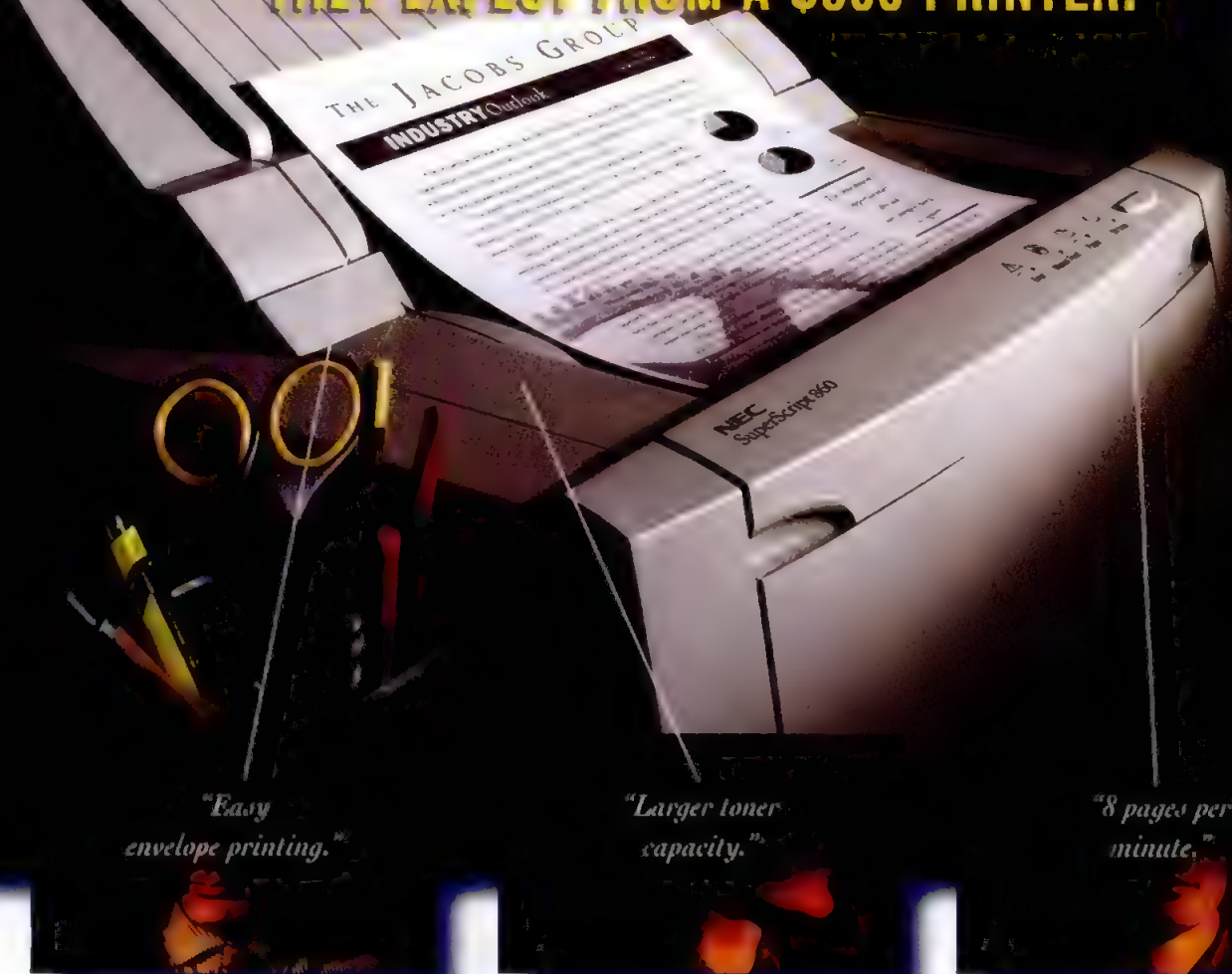
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internet

ESSENTIAL utilities

If Microsoft and Netscape get their way, your OS and browser will someday merge, and your browser will need more utilities than ever.

By Jan Ozer, Edward Mendelson, Sheryl Canter, and Andrew Boscardin

The time to dress up your browser is now. With the explosion of animation, audio, chat, video, and 3-D on the Web, surfing around without the utilities to play these files is like walking around with blinders on. You'll find tools to turn your toolbar into a search site and your browser into a rich publishing viewer. The best utilities are ones that enhance your online experience without getting in the way. *PC Magazine* has tested the ones that cost you nothing and make you wonder how you ever managed without them.

ANIMATION

Been Shocked lately? If not, you haven't been surfing some of the better-dressed Web pages on the Internet. Macromedia's **Shockwave** (www.macromedia.com/shockwave) is a viewer that plays files created in Macromedia Director, a popular animation creation and authoring tool. Director "movies" include images, animation, and audio, creating an advanced interactive multimedia experience ideal for the Web.

A great example to check out is Celebrity Slugfest (slugfest.kaizen.net), an opportunity to trade punches with the likes of O.J. and Bill Gates. Also check out the new Shockwave Digital Assistant, a remote control for Shocked Web surfing. Shockwave is available as both a plug-in and an ActiveX control.



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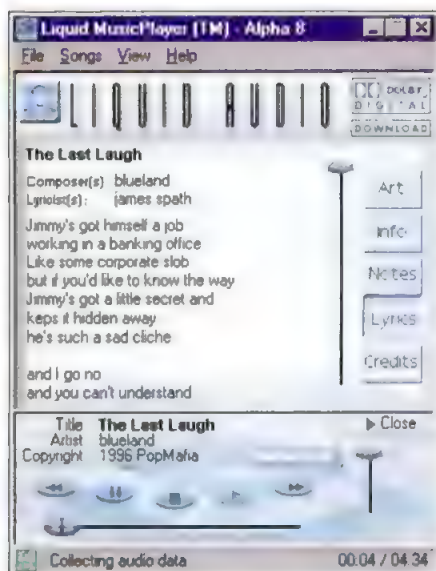
Download demo versions and discuss essential Internet utilities at www.pcmag.com

Narrative Communications' **Enliven** (www.enliven.com) product suite does Shockwave one better by converting Director movies into *streaming* files that start to play after a short buffer period. This makes Internet presentations and games remarkably interactive, as seen at Living Book Presentations (www.livingbooks.com), and offers a better low-bandwidth solution. Both the plug-in and ActiveX versions of the player are available. Note, though, that the two players aren't interoperable.—JO

STREAMING AUDIO

You won't hear much on the Web without Progressive Networks' **RealPlayer** (www.realaudio.com), which combines the superior audio quality and technology infrastructure of RealAudio with streaming video. Sites spotlighting RealAudio and RealVideo can be found at Progressive's own Timecast (www.timecast.com), a living guide to streaming content on thousands of Web sites.

DSP Group's **TrueSpeech** (www.dspg.com) is a helper application that delivers high-quality audio but has a more limited feature set than RealAudio. Unlike RealAudio, however, TrueSpeech is free to the developer, an always alluring concept that has garnered TrueSpeech more than 300 Internet sites. You can find an excellent sampling of TrueSpeech content



The Liquid MusicPlayer lets you view lyrics and album art while you listen.

at the CMI HOST Hub (www.cmihub.com), a speaker's bureau that provides résumés as well as audio and video samples of presenters.

Probably the hippest new audio application on the Web is LiquidAudio's **Liquid MusicPlayer** (www.liquidaudio.com), a standalone helper application that is part of a Dolby-encoded audio solution for trying and then buying music over the Internet. You can sample low-bandwidth music in an engaging player, complete with album art, liner notes, and lyrics. If you like what you hear, you can purchase and download the much larger-bandwidth CD-quality version, all within an integrated system providing copyright protection and royalty collection. You can preview both the system and David Bowie's latest at the e_mod Audio Room (www.e-mod.com).—JO

MIDI MUSIC

One of the most common audio file types available on the Web, MIDI is designed to control electronic instruments like synthesizers and samplers, without which files can end up sounding like mid-eighties video-game music.

Yamaha has solved this problem with its **MidPlug** plug-in (www.ysba.com/midplug_index.html). This full-featured MIDI playback control comes with the S-YG20 Soft Synthesizer, a powerful software synthesizer. It boasts full stereo versions of 128 General MIDI instruments and 8 drum kits, as

well as digital reverberation. The Soft Synthesizer works in concert with any MIDI playback device and is the best solution for anyone who wants to enjoy the vast MIDI resources of the Web. Sources of MIDI info and files on the Web include MIDIWeb (www.midiweb.com).—AB

STREAMING VIDEO

The first streaming-video technology on the market, VDOnet's **VDOLive Player** (www.vdolive.com) outputs one scalable stream for a range of connection speeds. This rewards high-bandwidth users with good-quality video. Those with slower connections still get acceptable quality video, with minimal audio breaks.

More than 600 sites feature VDOLive, but be sure to check out various automobile-related videos at the Auto Channel (www.theautochannel.com).

Another must-download is Vivo Software's **VivoActive** (www.vivo.com), available as a plug-in for Netscape Navigator or Internet Explorer. VivoActive is not scalable, which means you get fixed quality at all bandwidths and occasional audio breaks at low connection speeds. Nonetheless, VivoActive's pure low-bandwidth quality and ease of implementation make it a favorite on some pretty high-profile sites, including HBO's "The Larry Sanders Show" site (www.hbo.com/larry).—JO

QUICKTIME

Apple's **QuickTime** plug-in (quicktime.apple.com) lets users access the roughly 20,000 sites with QuickTime content, playing back audio, video, and QuickTime VR movies in what can be a totally involving Web experience.

At the Babylon 5 Web site (www.babylon5.com), you can rotate through 360-degree views of the observation dome, zooming in to examine cockpit controls and gauges.—JO

MPEG-1 VIDEO

MPEG-1 remains a popular video format for both quality and cross-platform compatibility on the Web. MPEG-1 files are too large to stream on most connections, however, meaning long download times for many users.

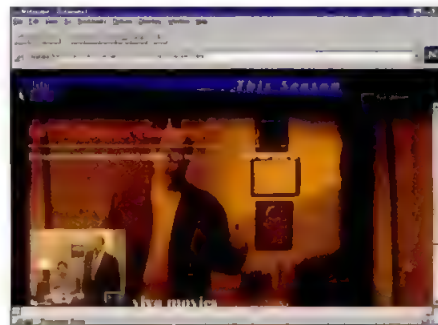
Enter the **InterVU Player**, from InterVU (www.intervu.com). MPEG-1 clips played with InterVU give you a preview of the

first frame. Click once and the video starts playing, advancing slowly as the file downloads. Click again and the video plays in real-time from cache. For an interesting MPEG-1 application, check out Sylvan Lawrence Co.'s site (branch.com/sylvan/sylvan.html), which uses MPEG-1 videos to show floor plans and aerial views of a Manhattan building for lease.

InterVU is an a necessity for those frequenting MPEG-1 video databases but is available only as a Navigator plug-in. Internet Explorer defaults to its integrated **ActiveMovie Player**, which can't display any video until the file is stored to disk.—JO

VRML

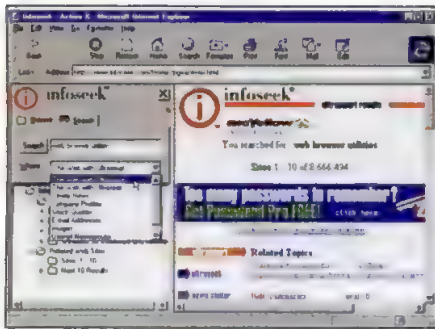
VRML represents the potential transformation of 2-D Web pages into 3-D worlds full of sound and motion. To explore these



View clips of "The Larry Sanders Show" with VivoActive.

worlds, you'll need a VRML browser like Sony's **Community Place** (vs.spiw.com/vs/cp_p.html), a VRML 2.0 viewer available as a plug-in or as a standalone helper application. Though much larger, the standalone version combines its VRML 2.0 controls with full text and voice chat features, letting you communicate with other people in multiuser worlds.

Vream's **WIRL 1.2** (www.vream.com) may be a VRML 1.0 browser (a 2.0 version is in the works), but its powerful and intuitive navigational controls and quick performance make it one of the best VRML viewers around. Available as a plug-in and an ActiveX control, WIRL provides effortless motion through VRML 1.0 worlds, which still make up the majority of 3-D sites on the Web. You can begin your exploration of the 3-D Web at the Weblynx Ultimate Virtual World Library (weblynx.com.au/virtual.htm).—SC



The Infoseek ActiveX control customizes your navigation through InfoSeek.

CHAT

For many users, the Web is a place to chat with others about shared interests. **ichat** (www.ichat.com), available as a plug-in, an ActiveX control, or an HTML or Java applet, turns your browser into a full-featured real-time chat client when you access any ichat site. The chat text is displayed in a window in the upper-left-hand corner of the display, while current participants are listed along the right. Right-click on a participant's name to send a private message. You can also create rooms and alter your online identity.

Netscape recently announced that ichat will be integrated into the next version of Netscape Communicator. Sites with ichat-powered discussion include Yahoo! Chat (chat.yahoo.com).—SC

ONE-CLICK SEARCHES

You want to check out half a dozen different search engines, but you're tired of visiting each one and typing in the same search string. The utility you need is Privnet's **AnySearch** (www.privnet.com), an add-on for Netscape Navigator 3.x and Internet Explorer 3.x. AnySearch gives you quick access to eight major search engines directly from your browser's toolbar.

AnySearch adds a button and text box to Navigator's main toolbar. Right-click on the button to select from a list of search engines. Enter a string in the text box, then click on the button to perform the search in the engine you've chosen. Your search string remains in place in the text box until you change it.

When AnySearch is used with Internet Explorer, the browser looks as it normally does. When you click on the Search button on the toolbar, a drop-down menu lets you select from AnySearch's menu of

search engines.

The **Infoseek ActiveX** control (www.infoseek.com) places a high-tech version of the Infoseek search-engine interface inside Internet Explorer 3.x. You use one tab of a dialog to browse categories and the other to search for specific strings in different subsets of the Infoseek database.

AltaVista gives away an AltaVista-only version of Grasp's **SearchPal** (altavista.software.digital.com/visionary/searchpal). The niftiest feature of this compact, four-button floating toolbar is its "capture and search" button. When you select some text in any Windows application and click on the button, your browser launches and searches in AltaVista for pages containing the selected text. Other buttons let you instantly access favorite pages.—EM

RICH PUBLISHING

HTML has limitations in its formatting capabilities, but that doesn't mean highly formatted, elaborate documents can't be read on the Web. With Adobe's **Acrobat Reader 3.0** (www.adobe.com), available as a stand-alone or a plug-in, you can view rich-content PDF (Portable Document Format) files on the Web. Using the plug-in version, you can view directly within your browser window richly formatted reference materials and documentation, frequently used by universities and government organizations.

Tumbleweed's **Envoy** (www.tumbleweed.com) plug-in, which requires less space and memory than Acrobat, lets you view stand-alone Envoy documents and Envoy documents embedded in HTML pages. To compare Envoy and Acrobat, visit the New York Times fax site (www.nytimesfax.com).—SC

MISCELLANEOUS

Stefano Barbato's **Flying Toolbars** (ftp://mcftp.mclink.it/mcprog/ftb10.zip) places at the edge of your screen a hideable toolbar that duplicates the Navigator 3.x toolbar and location bar. Flying Toolbars gives you a larger viewing window by letting you turn off the toolbars in Navigator itself.

Ken Blackney's **Navex** (mach5.noc.drexel.edu/navex) converts Netscape Bookmarks into Internet Explorer Favorites and back again. Features normally absent from this kind of program but offered here include the ability to filter out ampersands used as accelerator keys in bookmark files.—EM

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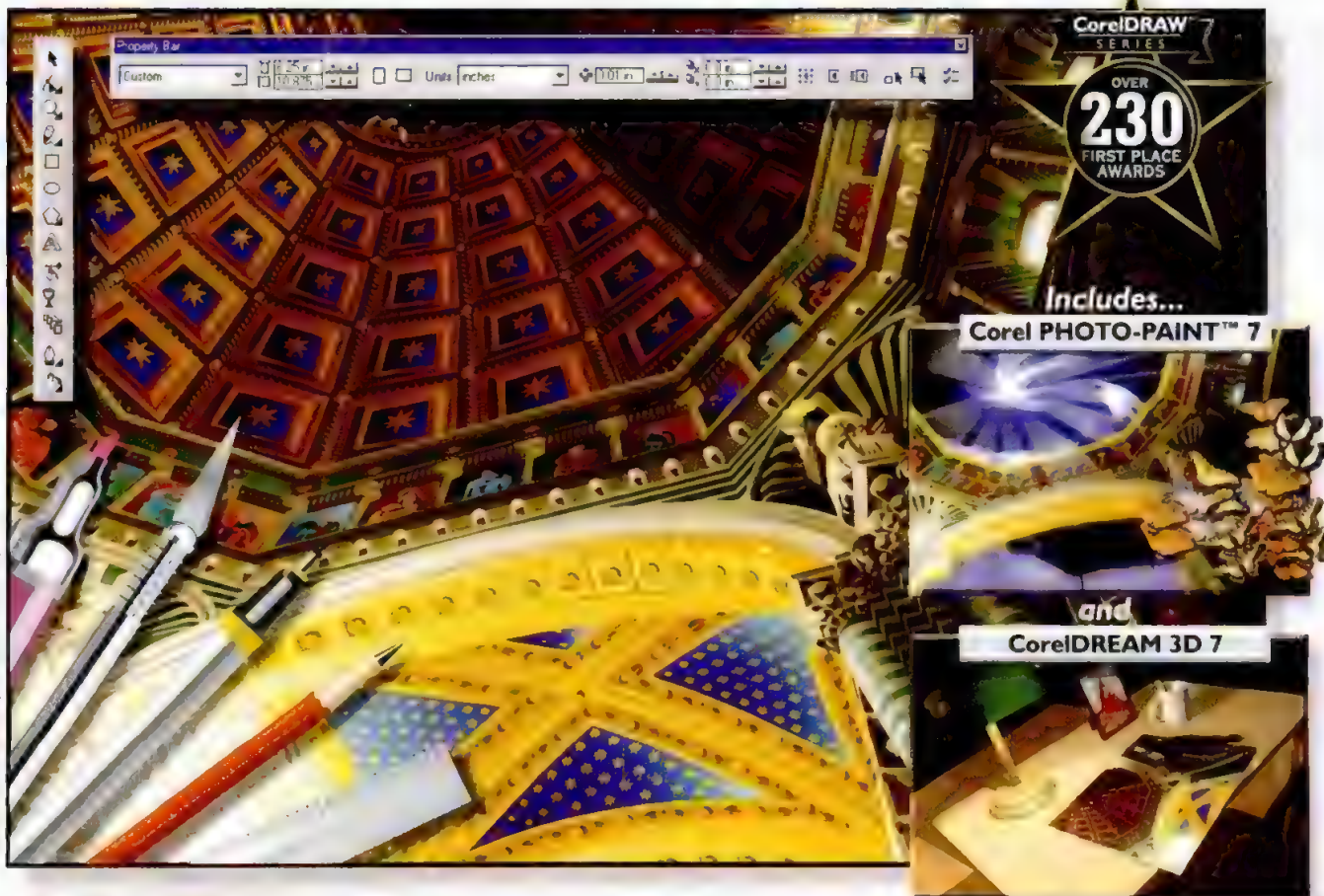
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YOU HAVE 0 EMAIL MESSAGES

EARTHLINK

HOME PAGE
HELP
SERVICES
THE ARENA
LEGO
THE STORE

START PAGE

HELP
MODIFY

EARTHLINK NETWORK
The Arena

SEARCH

SEARCH

☐ INFOSEEK
☐ EXECCO
☐ DOWNTOWN.COM
☒ EARTHLINK

WEATHER

LOS ANGELES

Monday
Partially cloudy and cool
55 / 69

Tuesday
Rainy and cool
60 / 48

NEWS [modify]
Your Start Page news is provided by Individual

Travel & Tourism
[Airlines Offer Travel Bargains Up to 75% Off](#)
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[Vanguard Airlines](#)
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[Motion Picture to Web](#)
[Tim Allen, Dana Carvey,](#)
[Dennis Miller, Kevin](#)
[Baum, Carl Reiner...](#)
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Music
[Online giant accused of](#)
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[CD on Giant Records New](#)
[Day](#)

STOCK QUOTES [modify]
Quotes are provided by PC Quote. Data is delayed 20 minutes unless noted.

Company Symbol	(MSFT)	(D)	(IBM)	(ATV)	(AAPL)	(NSCP)	(BIDU)	(COMP)
Last Sale	79 7/8	99 1/8	151 7/8	10 3/4	22 1/2	54 3/8	6337 16	1283 04
Net Change	+ 3 1/8	0	+ 3 1/4	- 1 3/8	- 1/8	- 1 3/8	+ 20.83	+ 16 72
Time of Last	16:01	17:01	16:29	16:00	16:01	16:01	14:04	13:44

WEB LINKS [modify]

EarthLink	Sports	Entertainment	Finance	My Favorites
EarthLink Home	EarthLink Sports	EarthLink's Hollywood	EarthLink's Finance	MSN Reference Desk
Daily link	ESPN	MovieLink 777FILM	Smart Money	News.com
The Arena	SportsLine USA	Hollywood Online	CNN Finance Network	Hottwire
The EarthLink Store	The Sports Network	Movie Review	NASDAQ	CNN
What's Hot	The Internet Movie Database	The Ultimate TV List	Investor Dictionary	Word
Technical Support	The Sports Server			Shareware.com
				USC

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ADDITIONAL utilities

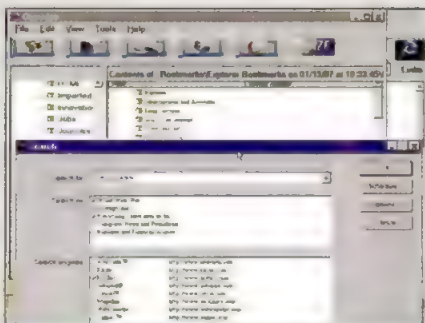
BROWSER ACCELERATORS

Datalytics Inc.

Blaze Web Performance Pack

The Blaze Web Performance Pack 1.0 (\$49.95 list) speeds up your Web usage by using idle modem and network time to engage in read-ahead browsing.

Although Blaze uses bandwidth more efficiently, you do need to allocate a lot of disk space for it to work best. While you're reading the first pages you've hit on a site, Blaze is downloading linked pages to your cache. A click on a hyperlink brings up the page much more quickly, because it's al-



Blaze doesn't just speed up browsing; it also includes an organizer and search tool.

ready on your hard disk. You need to stay on a site for a while for Blaze to do its job.

More interesting, Blaze goes beyond read-ahead browsing with Datalytics's xSpeed technology. Encapsulation—also called page-streaming HTTP—collects the multiple files in a Web page into one big bundle, transforming many HTTP connections into one larger connection. With page-streaming HTTP, all those connections you see on your browser's status bar while it's downloading a single Web page start to disappear.

Datalytics has made page-streaming HTTP available for major Web servers, such as Microsoft Internet Information Server, Netscape's servers, and the extremely popular Apache server for Unix. If Web designers incorporated xSpeed technology into their offerings, a 28.8-Kbps modem

could rival ISDN or even faster connections.

Blaze also gives you a search tool that lets you find information through the Internet's various search engines or in the cache of material you've downloaded so far. You also get an organizer to help you keep track of your bookmarks, your search results, and any scheduled sessions you've produced.

Blaze Web Performance Pack 1.0. List price: \$49.95. Datalytics Inc., Dayton, OH; 937-226-7700; www.speeditup.com. *Circle 513 on reader service card.*

Peak Technologies Inc.

Peak Net.Jet

Surf the Web for more than a few hours and you'll start wishing for greater speed. True, you can invest in an ISDN line or a T1 connection if you're a business user or a fanatic, but you might want to give Peak Net.Jet 1.14 (\$29.95 list) a try first. This easily installed Java program can make some of your browsing seem almost instantaneous.

Net.Jet works by not letting your modem or network sit idle. While you take in the first page or two of a Web site, Net.Jet downloads the rest of it to a special cache. Note, however, that because Net.Jet is a Java application, it can be slow to load and unload.

Net.Jet uses read-ahead technology to scan for hyperlinks in the site and then automatically drags the linked pages over. If you click on one of those links, the new page loads quickly, because it's sitting on your hard disk. Net.Jet's cache system thus works opposite to those of Web browsers, which focus on where you've been rather than where you might go.

But Net.Jet doesn't ignore your past. Instead, it uses intelligent caching to track your most visited sites, then uses more idle modem or network moments to see if there have been changes. Unlike off-line browsers, Net.Jet works only while your browser is open, but the improvement in access speed is more than noticeable.

The only real problem with Net.Jet is that it causes a dramatic increase in HTTP trans-

actions. As a result, some servers refuse Net.Jet requests. But that won't stop this program from becoming extremely popular. **Peak Net.Jet 1.14.** List price: \$29.95. Peak Technologies Inc., Bellingham, WA; 800-453-5322, 360-733-6010; fax, 360-733-7818; www.peakmedia.com. *Circle 514 on reader service card.*

INTERNET ORGANIZER

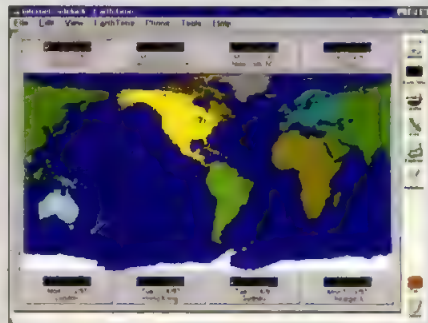
Starfish Software Inc.

Internet Sidekick

On its own, Starfish Software's Sidekick has always been a perfectly good planner, scheduler, contact manager, and appointment coordinator. But now Internet Sidekick 1.1 (\$49.95 direct) injects some steroids into the old PIM, specifically in the form of the Internet.

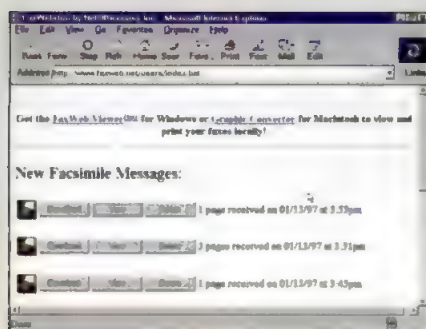
You can include URLs in the card file and launch your browser directly from the PIM. Much more important, you can use the Internet to schedule appointments, meetings, and online events, such as chat sessions and videoconferences.

A scheduling wizard guides you through the time, date, location, and the selection of



EarthTime is one of the utilities in Starfish's Internet Sidekick.

participants from your e-mail address books (you can import your Netscape, Exchange, and Eudora Pro lists), then sends the information to the participants via e-mail. If you cancel or change an event, Internet Sidekick e-mails all the participants. The program uses your existing e-mail client rather than offering one of its own, and at installation time grabs the server and ad-



Using FaxWeb, you can view the faxes you receive from within your browser.

dress information from that client.

Two other Internet extras are EarthTime, which lets you keep tabs on times and dates in cities around the globe, and Web Publisher, an add-on to convert your calendar and contact lists into HTML for publishing on the Web (Web Publisher wasn't available for review but will be part of Sidekick 97 by the time you read this).

Internet Sidekick 1.0. Direct price: \$49.95. Starfish Software Inc., Scotts Valley, CA; 888-782-7347; fax, 408-461-5900; www.starfishsoftware.com. *Circle 515 on reader service card.*

INTERNET FAX UTILITIES

FaxSav Inc.

FaxLauncher

The Internet uses the same telephone system as your fax machines, so it only makes sense that companies such as FaxSav, with its FaxLauncher program (\$0.15 per page, \$15 minimum prepayment), are setting up fax servers that take your documents over the Internet to fax machines that are connected to normal phone lines. FaxLauncher only sends (it does not receive) faxes; however, it does a good job and will save you money on international phone rates. Faxes inside the U.S. cost \$0.15 per page; to the U.K., \$0.23; and to Japan, \$0.38.

If you've ever used any fax program with Windows, you'll have no trouble getting FaxLauncher up and running. FaxLauncher offers no way of importing your existing list of fax recipients, but it does support faxes to multiple recipients. In addition, FaxSav offers EZ-Lists, which you can store on FaxSav's servers and use as you wish. You don't have the full functionality of a fax program like WinFax, though.

Your fax is sent across the Internet to a

FaxSav server, which transfers it to the closest server to the recipient and then dials the destination fax number for delivery. The fax is protected by 40-bit RSA security from the time it leaves your machine to the time the destination number is dialed. You pay only for successful fax transmissions, and these generate an e-mail message telling you how much they cost. And cost is important, since the whole point behind using FaxLauncher is that it can save you long-distance expenses. **FaxLauncher.** List price: \$0.15 per page and up; \$15 minimum prepayment. FaxSav Inc., Edison, NJ; 908-908-2000; www.faxsav.com. *Circle 516 on reader service card.*

NetOffice Solutions LLC

FaxWeb

Once upon a time, having a single phone line for voice, data, and fax was a reasonable solution. So was the idea of calling into the office while traveling to get your faxes either read or forwarded to you. Today, neither option is viable. You need a separate line for your faxes, and you need a way to read your faxes directly while on the road.

FaxWeb, a valuable service and utility for receiving faxes, solves both problems. For \$15 a month, you get a fax number with an Atlanta area code (404). Give this number to your clients and colleagues and they can send your faxes there instead of to your office number.

Then, log on to the Internet, fire up your Web browser, head for the FaxWeb site, and view your faxes online with FaxWeb's free viewer, which installs as a plug-in in your browser. When you receive a fax, you'll be notified by e-mail, so there's no need to keep checking the site.

You can get a toll-free fax number that will cost you \$0.30 a minute extra, and FaxWeb also offers a voice mailbox for an additional \$5 a month (messages are retrievable via RealAudio or a .WAV player). The whole idea might seem a bit expensive until you consider the cost of an additional line, a second fax modem to go with it, and the inconvenience of missed faxes. FaxWeb offers a real solution for business travelers that takes advantage of the convenience of the Internet.

FaxWeb. List price: \$25 setup fee; \$15 a month. NetOffice Solutions LLC, Atlanta, GA; 770-451-8675; fax, 404-248-6801; www.faxweb.net. *Circle 517 on reader service card.*

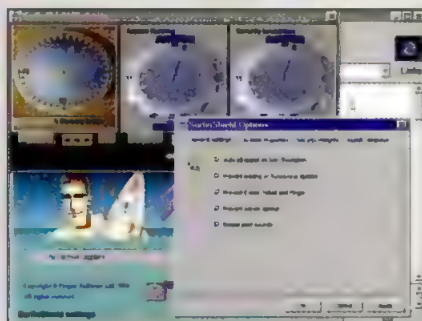
JAVA SECURITY

Finjan Software Ltd.

Surfin' Shield

Just when you thought it was safe to go into the Java ocean, Finjan Software's Surfin' Shield 2.0 (\$99 list) shows you—very clearly—that it's not. Java applets are programs that actually run on your desktop. Surfin' Shield monitors what these applets are doing and alerts you to suspicious behavior.

Surfin' Shield assigns weights to possible security violations and packs them into a list that's accessible through the configuration menu. If the applet tries to read, write, delete, or run a file on your local drive, it gets maximum weight. Other activities, such as reading system properties, get less weight, but Surfin' Shield still alerts you to them. The program can kill suspicious applets automatically, and you can even have your browser refuse all suspicious applets.



Surfin' Shield helps you monitor all Java activity on your system.

Surfin' Shield monitors your Java run-time environment, making you aware of all running applets and the resources they're commanding through a colorful statistics screen. The same kind of protection is available for the corporate environment in a more advanced package, Surfin' Gate. Given that an increasing amount of the Web is composed of Java applets and applications—including those being pushed onto your hard disk by packages like Marimba's Castanet—a strong protection mechanism is clearly a good idea. —Neil Randall

Surfin' Shield 2.0. List price: \$99. Finjan Software Ltd., Netanya, Israel; 888-346-5268; www.finjan.com. *Circle 518 on reader service card.*

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- 8X SCSI CD-ROM Drive
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- Intel LANDesk Server Manager v2.5x
- NEW Dell Server Assistant CD-ROM
- MS Windows NT Server 4.0 (10 Client Access Licenses)
- 6 Expansion Slots: 3 PCI, 3 EISA
- 6 Drive Bays: 3 External 5.25", 3 Internal 3.5"
- 3 Year Limited Warranty

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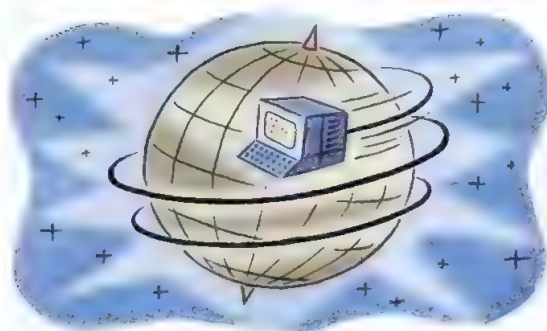
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internet

OFF-LINE browsers

Your connection to the Internet is slow; your hard disk is fast. And you're on the road a lot. But that's no excuse for not keeping up with what's on the Web, thanks to off-line browsers. *By Edward Mendelson*

Whether you're tired of the World Wide Wait, are often away from a phone line, or simply want to stay up-to-date on your favorite Web sites, an off-line browser can help. These utilities quickly download remote Web pages or complete Web sites to your hard disk and allow you to surf the Web untethered. When you click on a hyperlink in a remote page, no longer do you have to wait for the linked page to download; with off-line browsers, when you click on a hyperlink in a cameo page, the linked page—if you downloaded it as well—appears instantly.

Off-line browser is the name commonly applied to Web-downloading utilities, but the term is misleading. Almost all of today's off-line browsers display downloaded pages using your standard Web browser (most often Microsoft Internet Explorer or Netscape Navigator). The utility does the job of searching and downloading pages and organizing them on your disk, but when you want to view the pages the program also launches IE, Navigator, or any other browser you prefer. Folio Web Retriever 2.1 is the exception among those we tested: It uses its own proprietary viewer to leverage Folio Corp.'s Infobase technology, which provides incredibly fast and flexible text searches.

Other products employ your browser to display indexes or

tree-structured lists of your downloaded pages, or to display new data from sites that the utility checks for changes at regular intervals. And some of the products include search tools that locate downloaded pages containing the text you specify. But however varied the programs' individual feature sets, all of them are designed to give you the riches of the World Wide Web without the wait.

These utilities range in style from unobtrusive products (such as FreeLoader 2.5) that use your browser as the interface to in-your-face giants (such as Web Buddy or WebWhacker 2.5) that clutter your screen with a toolbar and install an icon in the Taskbar tray. Some packages, such as Surfbot Plug-in 3.0, add controls to your browser. And note that a review of Traveling Software's beta of WebEx 2.0 is also available on our Web site. (At press time, a public beta version of the product was not available.) WebEx's prior version, 1.5, was one of the Best Products of 1996 in our issue of January 7, 1997.

Internet software is still at an early stage of development, and future generations of Web browsers promise to include off-line features that now require separate programs. But until those generations come of age, the utilities we review on the following pages represent the most effective way of putting Web pages on your hard disk.



Join Us Online

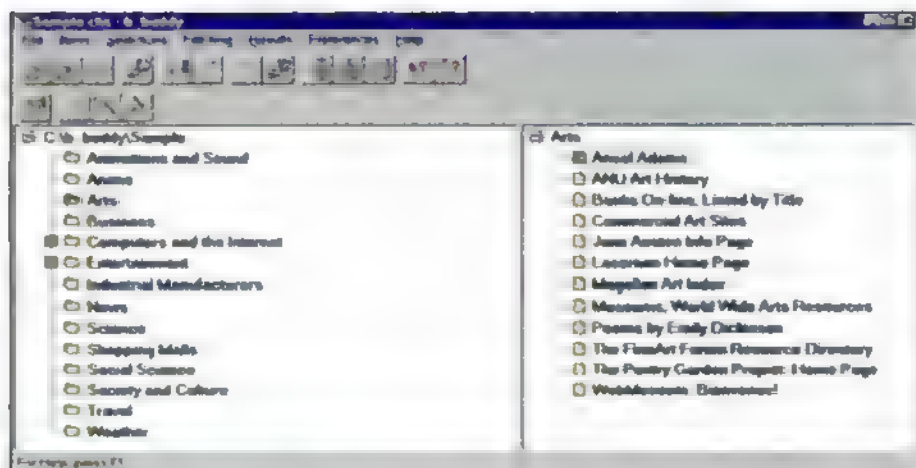
Download demo versions and discuss Internet off-line browsers at www.pcmag.com

Off-Line Browsers

Softbots Inc.

Browser Buddy

If you're looking for an off-line browser that has a cleanly organized interface, you'll find one in Browser Buddy 1.2. But you'll also encounter limited functionality and numer-



Browser Buddy displays "Choices" files in its left-hand pane, and on the right it displays URLs contained in the folders.

ous minor anomalies in this product.

In this off-line tool (\$39 list price), you organize groups of related Web sites as Choices, which point to local directory structures that store site data. Choice files can contain one or more folders, and Browser Buddy displays them in the left-hand pane of the program window. Click on any folder and you'll see its URLs in the right-hand pane. To select a URL for fetching to your hard disk, simply double-click on it. Browser Buddy works with any browser.

When you do so, the program will display a dialog box where you can select download options. But these limited, inflexible drill-down options allow you to download only the first page of a site and of sites linked to it. In addition, Browser Buddy doesn't let you monitor sites for changes, and you can schedule a download only at a specified time, not at regular intervals.

The anomalies that we encountered

started with the installation, when the program did not create Start menu items as it should have. Moreover, Browser Buddy does not let you delete downloaded data from within the program's interface; you must perform this task manually from Windows Explorer. Because of Browser Buddy's rough edges and its limited options, another off-line browser utility will probably better suit your needs.—*Sheryl Canter*

Browser Buddy 1.2. List price: \$39. Requires: 386-based PC or better, 8MB RAM, 10MB hard disk space, Microsoft Windows 3.1 or later or Windows NT 3.51 or later. Softbots Inc., Waterloo, Ontario, Canada; 519-743-4569; fax, 519-744-2302; www.softbots.com. *Circle 482 on reader service card.*

Folio Corp.

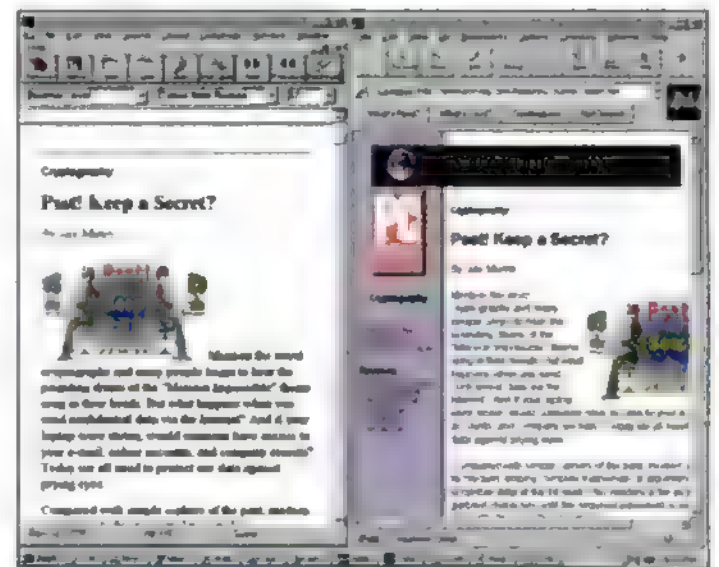
Folio Web Retriever

Though Folio Web Retriever 2.1 has numerous restrictions compared to other off-line browsers, it does offer some unique advantages.

Web Retriever (\$39.95 list price), which now supports Windows 3.1 with Win32s, works independently from your browser, storing Web data in Folio's proprietary Infobase format that supports multiuser access and full-text searching. Its ability to add notes and searchable highlights to downloaded Web content is unique. On the downside, the database viewer does not support the full HTML command set; notably lacking is table support. Scheduling options are also very limited.

The program's main interface is the Viewer, and you use it to launch the Retriever, where you set all of your download options. First you select the destination database file; if you select one that already exists on your hard disk, you can choose whether to overwrite it or append to it—a useful feature. Next you create a list of URLs to download by entering them one at a time in an edit box. (URLs are limited to 80 characters.) Web Retriever allows you to save download lists as text files for subsequent use. To see and load databases that you've created, you use the File Open command.

You can update only one database at a time, and Web Retriever doesn't monitor Web sites for any changes. As with Browser Buddy, you can schedule downloads only at a specific time, not at regular intervals, and delayed downloads won't



Web Retriever (left) saves content but not some formatting details, such as HTML tables.

work if your ISP requires a password. So although this off-line browser includes some unique features, you should look elsewhere for a more comprehensive product if you don't need them.—*SC*

Cache Browsers

As you browse the Web, your browser leaves a telltale signature of your travels in the form of a disk cache. Full-featured off-line browsers are designed for retrieving information from the Web. But if you simply want to revisit the files you've already seen, a cache browser may be all you need.

Product	List price	Company	URL	Description
Cache Explorer	\$20.00	Mwsoft	ourworld.compuserve.com/homepages/m_wolf	Provides a Windows Explorer-like view of cache. Double-click on a file to view it. Can also perform full-text searches. Versions for Netscape Navigator 2.0 or later and Internet Explorer 2.0 or later.
Cache Master	\$16.00	Off-Site Labs	www.neosoft.com/~osl	Works natively with Netscape Navigator or with any browser using the Windows Clipboard. Can create HTML thumbnails of files. Interfaces with popular search engines.
Cache Meister	\$22.00	Robert Wetzler	www.fastlink.com.au/wetzler	Looks up cache files and searches them by keywords. Sorts files by type or by time and date visited. Works with Netscape Navigator 2.0 or later.
NearSite	\$49.95	Info Evolution Ltd.	www.nearsite.com	A full-featured cache browser that uses intelligent bookmarks and an Autobrowse feature to retrieve and store pages. Toolbar can be minimized to Taskbar icon. Works with any browser.
UnMozify	\$24.00	Info Evolution Ltd.	www.evolve.co.uk	A straightforward cache browser for Netscape Navigator 2.0 or later. The latest version includes a search function and the ability to preserve external links.

Folio Web Retriever 2.1. List price: \$39.95. Requires: 486-based PC or better, 8MB RAM, 3MB hard disk space, Microsoft Windows 3.1 or later or Windows NT 3.51 or later. Folio Corp., Provo, UT; 800-543-6546, 801-229-6700; fax, 801-229-6788; www.folio.com. *Circle 484 on reader service card.*

FreeLoader Inc.

FreeLoader

A free, advertiser-supported, basic off-line tool, FreeLoader 2.5 displays advertisements in your browser along with the information that you have requested. We tested the product's beta 1.

When you install the product, you must enter your system's specifications. You can also optionally input your first name, ZIP code, country, sex, age, income, or profession. If you do so, FreeLoader passes the information on to advertisers, who can target you based on the sites you download.

Like Surfbot, FreeLoader works as an add-on to your browser (Microsoft Internet Explorer 3.0 or later or Netscape Navigator 2.0 or later). Unlike Surfbot, though, it does not get in the way of normal browser usage. Its interface adds a narrow toolbar below your browser's status bar, for accessing downloaded data and options. When you aren't using FreeLoader, you can ignore or minimize the toolbar.

FreeLoader organizes Web content in "channels," which appear as buttons along the display's left side. You can add new ones, and you can delete all of the presets except Front Page, which lists a selection of news stories that is customized according to your profile. The beta version we tested (the shipping version should be available by the time you read this) had some display problems: Buttons were sometimes the wrong color, and some custom buttons weren't 3-D.

You can schedule downloads to occur hourly, daily, weekly, or monthly, but FreeLoader doesn't let you set a one-time download. Also, you must set the schedule individually for each site, which can be very tedious if you are monitoring many sites. And you can't control the type of content you download or obtain site maps. Still, FreeLoader can handle the basics, and for a very nice price. (Softbank, the parent company of PC Magazine and Ziff-Davis Publishing, is an investor in Free-

Editors' Choice

- InContext
- FlashSite 1.01
- Teleport Pro



By this time next year, you may find that your browser

of choice—say, Netscape Navigator or Microsoft Internet Explorer—includes many of the features now available only in off-line browsers. But today, you can choose from a whole crop of off-line browsers. With features like simple and powerful scheduling options, easy-to-use interfaces, speedy update notification, and the ability to set limits on hard disk space usage, a handful of these off-line browsers really shine. Our two Editors' Choices, InContext Systems' InContext FlashSite and Tennyson Maxwell's Teleport Pro, go even further than most.

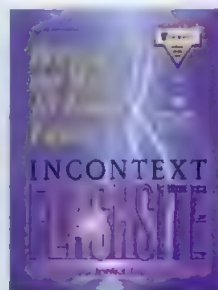
Seamlessly integrated into your Web browser, FlashSite includes some notable features: You can map a site without downloading it, and the program very ef-

fectively runs—as well as manages—multiple jobs simultaneously. If you do download a site, FlashSite lets you set limits by link depth or disk space, and you can specify which data types you want to retrieve.

Teleport Pro downloads entire Web sites at top speed and gets you only the files you need, whether you want to search a remote site for pages containing specified text or download all the server-side image files. And its wizard interface will make novices feel welcome.

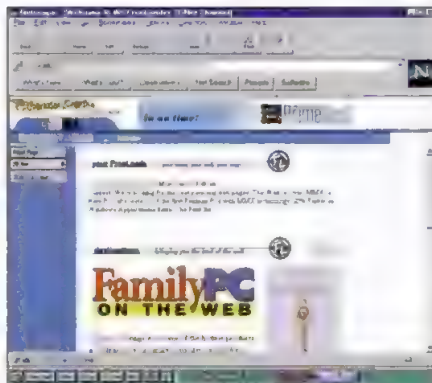
Two off-line browsers deserve honorable mention here. With elegant yet simple interfaces and a few singular conveniences, both Tierra Communications' Tierra Highlights2 and Version 1.01 of PaperClip Software's WebClip make their mark. Currently, though, both lack a well-developed feature necessary for superior off-line browsing that our Editors' Choice products provide: the ability to drill down through a series of levels at one site.

Nonetheless, you'll still find special conveniences in each: WebClip comes with a unique versioning feature that lets you archive Web content, much like the way you might keep back issues of magazines. And as its name implies, Tierra Highlights2 handily flags any updates to specified sites in any one of a variety of colors.



Loader Inc.)—SC

FreeLoader 2.5. List price: Free. Requires: 486-based PC or better, 8MB RAM, 3.5MB hard disk space, Microsoft Windows 3.1 or later. FreeLoader Inc., San Francisco; 415-626-8500; fax, 415-626-2006; www.freeloader.com. *Circle 485 on reader service card.*



FreeLoader organizes Web content in "channels," displayed as buttons.

InContext Systems

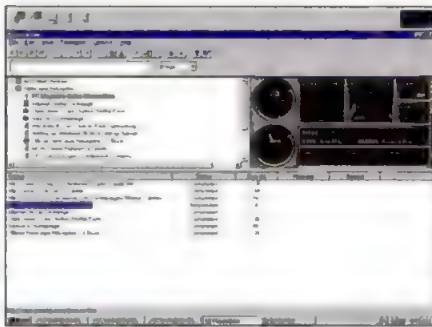
InContext FlashSite



Featuring seamless integration with your Web browser and excellent functionality, InContext FlashSite 1.01 moves invisibly between local and remote data as you surf the Web.

This off-line tool (\$35 street price) includes a floating FlashBar, which lets you access most functions from within your browser. The program also lets you map a site without downloading it. When you do download, you can set limits by link depth or disk space, and you can specify which data types you want to fetch. You cannot, however, download links to sites on other servers. Scheduling options are flexible, and FlashSite reports any updates to Web sites.

The three-pane user interface displays Web sites in the upper-left pane, and you can arrange them hierarchically into



FlashSite's unique control panel displays the progress of downloads.

"drawers" and folders. A site's icon indicates its status: bookmark, local page, full download, custom download, or site map. FlashSite labels sites with their page names; the URL of the highlighted site appears on the status bar.

To schedule a download, right-click on an item and select from its context menu. FlashSite supports Netscape Navigator 3.0, and it can download advanced elements such as sound and other multimedia.

You can schedule multiple downloads at once, and each job's progress appears in the upper-right pane, which resembles an airplane control panel by default. In addition, FlashSite lets you suspend and restart jobs.

Scheduling options include downloading once, hourly, daily, and weekly, and a check box lets you "automatically run job if missed." All in all, FlashSite is an extremely capable and easy-to-use off-line tool.—**SC InContext FlashSite 1.01.** Street price: \$35. Requires: 486-based PC or better, 8MB RAM, 12MB hard disk space, Microsoft Windows 95. InContext Systems, Toronto, Ontario, Canada; 800-263-0127, 416-922-2515; fax, 416-922-6489; www.incontext.com. **Circle 483 on reader service card.**

Lotus Development Corp.

Lotus Weblicator

Want to see the power of the Lotus Notes object store? Check out Lotus Weblicator, an off-line browser built around a Notes 4.x database. Even if you don't care about Notes, you still should take a look at this product; few of the others reviewed here can match its level of sophistication.

We tested Weblicator's first public beta. This add-on (\$29.95 list price) to Microsoft Internet Explorer 3.0 and Netscape Navigator 2.0 (both run on Windows 95 and Windows NT) should be

available around the time you read this. The version we tested was not feature-complete, nor was the interface finalized.

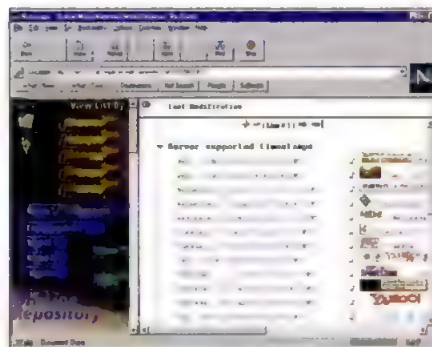
Still, much of the product's potential is apparent. Weblicator includes a dashboard at the bottom of each HTML page, a feature that lets you make a local version of a page or site, monitor a selected site for changes, add a site to your list of favorites, jump to the Weblicator workspace, get help, and toggle between online and off-line modes.

Weblicator's replication settings allow you to download many levels deep without bringing down extraneous data. Lotus claims that Weblicator will be able to download virtually any object on a Web page, including Shockwave applets and other multimedia elements, as well as Java. This feature was not working in our beta, however.

Unlike most of the other products in this roundup, which store downloaded data as individual files on your hard disk, Weblicator stores it in a Notes database. The database compresses the data and can encrypt it, requiring a password before a user can access any pages. You can categorize pages or sort them by date of download or by starting URL. Weblicator also lets you view any Notes database from within your browser.

Lotus Weblicator looks like an enticing choice in the off-line browser market. We hope that the product's final implementation will live up to the specifications.—**Ben Z. Gottesman**

Lotus Weblicator. List price: \$29.95. Requires: 486-based PC or better, 16MB RAM, 15MB hard disk space, Microsoft Windows 95 or later. Lotus Development Corp., Cambridge, MA; 800-346-1305, 617-577-8500; fax, 617-693-0968; www.lotus.com. **Circle 486 on reader service card.**



Weblicator converts information about downloaded sites into HTML.

Tympani Development Inc.

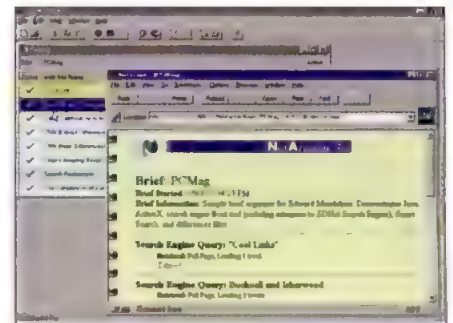
NetAttaché Pro

A sophisticated tool for retrieving information from the World Wide Web, NetAttaché Pro offers advanced features for off-line browsing.

NetAttaché Pro (\$49.95 list price) highlights new material it has found on remote pages since it last checked them, collecting data from a large variety of sources with a single operation. It can store multiple versions of a page and automatically highlight their differences.

NetAttaché Pro operates as a stand-alone program, and you use it to set up and launch your search requests. During a search, you can still use your browser. When you want to view the downloaded data, NetAttaché Pro launches the browser of your choice and does not interfere with it.

You organize your searches in "briefs," each containing one or more separately

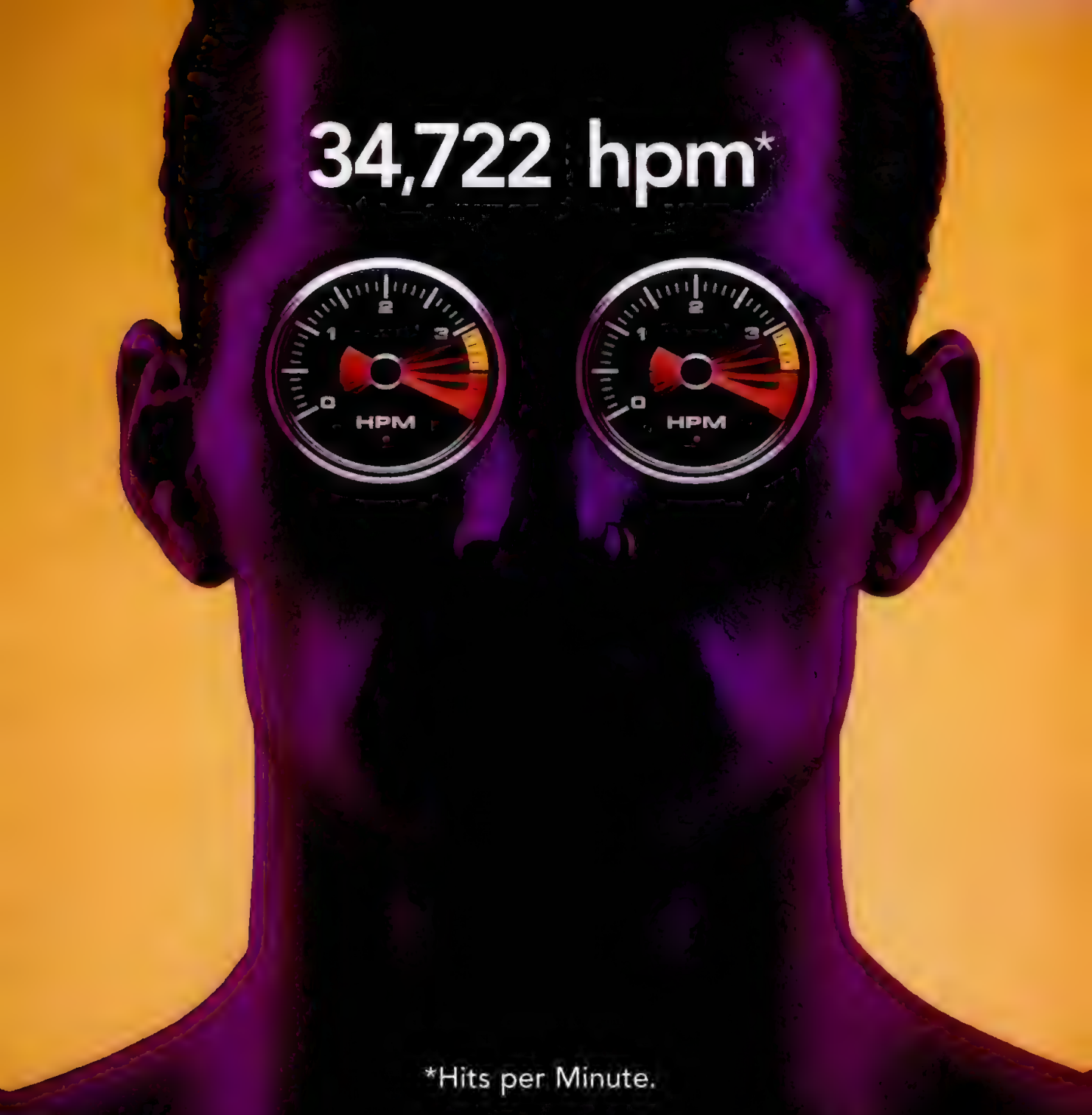


NetAttaché Pro lists its downloads and search results in your browser.

configurable "agents." One agent in a brief might perform a Boolean search using AltaVista, another might download a corporate Web page, and so forth. NetAttaché Pro provides various options for using the agents, such as having them mark any updates since the last download.

When you launch a brief, either manually or through a built-in scheduler, NetAttaché Pro connects to the Internet and downloads the pages that the agents specify. When you want to view the results, the program opens your browser and displays a list of the pages it has downloaded for each agent. The pages open in the browser when you click on their names.

The interface may confuse novices; designed for serious and sustained use, NetAttaché Pro ultimately isn't for everyone. But if you need its specialized features,



34,722 hpm*



*Hits per Minute.

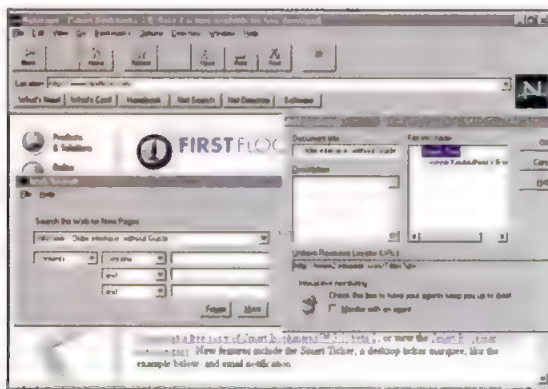
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CIRCLE 135 ON READER SERVICE CARD OR GO TO WWW.PCMAG.COM/ProductLink



Smart Bookmarks is tightly integrated with your browser.

it's a powerful and efficient tool.—*EM*
NetAttaché Pro. List price: \$49.95. Requires: 386-based PC or better, 4MB RAM, 10MB hard disk space, Microsoft Windows 95 or later. Tympani Development Inc., Sunnyvale, CA; 408-735-9555; fax, 408-735-9550; www.tympani.com. Circle 487 on reader service card.

First Floor Inc.

Smart Bookmarks

One of the first effective off-line browsers, Smart Bookmarks 3.0 still follows through. In its third version, though, it falls behind some of the other products in interface functionality and ease of use. We tested a beta release; the shipping version should be available by the time you read this.

Once you install Smart Bookmarks (\$34.95 list price), it basically nestles itself within your browser (Microsoft Internet Explorer 2.0 or later or Netscape Navigator 3.0 or later). But when you launch your browser, Smart Bookmarks launches its own interface (which has a hierarchical folder system), unless you take some inconvenient steps to tell it not to. This approach makes for somewhat cumbersome navigation.

Agents monitor sites for updates; choose View Results in your browser and you come to Agent Results, which lists updated sites alongside your browser interface. But although Smart Bookmarks accurately downloads pages, it doesn't identify text that has changed (unlike products such as FlashSite), and it won't download an entire site or even all links from a page.

These inconveniences aside, Smart Bookmarks provides some useful features. You can use up to five keywords to search certain sites, and you can schedule updates at start-up, at intervals of a certain number of minutes, daily, or during certain days of the week.

Still, you may find yourself spending more time navigating through Smart Bookmarks than using it as an off-line

browser tool.—*Yvonne Koulouthros*

Smart Bookmarks 3.0. List price: \$34.95. Requires: 486-based PC or better, 8MB RAM, 5MB hard disk space, Microsoft Windows 3.1 or later. First Floor Inc., Mountain View, CA; 800-639-6387, 415-968-1101; fax, 415-968-1193; www.firstfloor.com. Circle 488 on reader service card.

Surflogic LLC

Surfbot Plugin

Although close integration with a browser is desirable, Surfbot Plugin 3.0 (\$39.95 list price) gets in the way of your browser more often than not. A plug-in to Microsoft Internet Explorer 3.0 or Netscape Navigator 3.0, it has features that work only sometimes, and browser crashes were frequent in our tests.

Surfbot allows you to schedule online searches and site downloads; it has many

Surfbot adds two activators to your browser's title bar: a "Surfbot" label, on which you click to open the Surfbot interface, and an Add button, for adding to a list of sites (called an *Agent*) you want to download. When you open Surfbot, it splits the browser window into two panes, with Surfbot on the left and the browser display on the right. It displays the active Agent as a collapsed tree structure, and menu buttons across the top let you set options.

Surfbot can interfere with your browser by making you lose your place. For example, when you click on an Agent name to set its properties, the utility may load the Surfbot 3.0 Start Page in the browser pane. When you select a URL to set its properties, Surfbot loads the URL.

If you hide Surfbot, you can still use the Add button to add sites. When Surfbot is open, you can also add a site by typing the URL or dragging a hot link from the browser display. But because clicking on a hot link leads the browser to display a page, you must drag it fast—and it doesn't always work. Also, when you open a site, the Surfbot window sometimes disappears. In short, we found Surfbot unreliable and unstable, and we recommend you look elsewhere.—*SC*

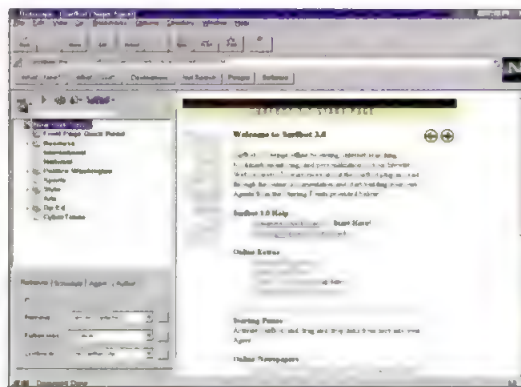
Surfbot Plugin 3.0. List price: \$39.95. Requires: 486-based PC or better, 8MB RAM, 2MB hard disk space, Windows 95 or Windows NT 4.0. Surflogic LLC, San Francisco; 800-731-0255, 415-731-2732; fax, 415-731-0584; www.surflogic.com. Circle 489 on reader service card.

Tennysen Maxwell Teleport Pro



Downloading whole sites at top speed and zeroing in on only the files you need, Teleport Pro (\$40 street price) is one of the most flexible, powerful, and easy-to-use off-line Web retrievers.

Using a wizard interface, beginners can direct the program to create "projects" for downloading remote sites or pages, search a remote site for pages containing specified text, or download any file type from a remote site. Teleport can even perform advanced feats such as scanning server-side image maps and converting them into client-side image maps.



Select the Surfbot Agent name to set its properties and the Start Page is displayed to the right.

scheduling choices and unusually flexible download options. A SmartDelete feature lets you eliminate URLs from future updates, but it doesn't always work. "All file" downloads work inconsistently; graphics appear on some pages but not others.

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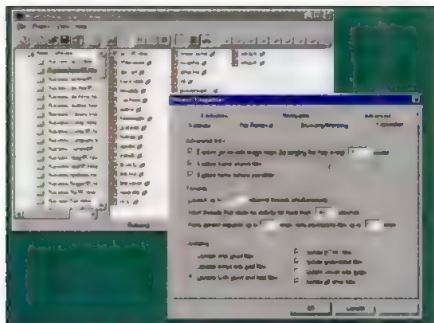
For more information or to request a free demo: 1-888-5-THEWALL, info@thewall.com or visit us at www.thewall.com



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Teleport Pro's Explorer-style interface conceals a vast range of options.

Teleport downloads all specified files and lists them in an Explorer-style window, listing pages in the left pane and each page's text, graphics, and multimedia files in the right pane. When you want to view a page or a multimedia file, you simply click on it. Pages open in your default browser (any one works with Teleport), and graphics files open in the default Windows viewer for that file type.

Teleport can relink downloaded Web sites, translating hyperlinks to downloaded pages into links between the files on your hard disk. And when you launch a project a second time, the program

downloads only changed pages. With a click on a toolbar button, you instruct the file list to display only those pages.

Teleport also comes with a very neat scheduling option, which appears on the main menu: A Scheduler window lets you run projects on either the same or separate schedules. In addition, the program doesn't use the browser until you view a file, doesn't interfere with your browser installation, and lets you save projects anywhere on your disk.

Providing powerful features behind a simple and elegant interface, Teleport Pro stands out as a superior off-line browser.—EM

Teleport Pro. Street price: \$40. Requires: 386-based PC or better, 4MB RAM, 10MB hard disk space, Microsoft Windows 95 or later. Tennyson Maxwell, Cambridge, MA; 617-576-1099; fax, 617-576-1089; www.tenmax.com. *Circle 490 on reader service card.*

Tierra Communications Inc.

Tierra Highlights2

With precise, speedy Web site updates as well as simplicity and ease of use, Tierra Highlights2 ranks among the bet-

ter off-line browsers. A nifty highlighting component and a seamless interface also give it an edge over much of its competition.

The interface of this product (\$49.95 list price) appears unobtrusively as a column wherever you like and in any width, next to the interface of your browser (Microsoft Internet Explorer 2.0 or later or Netscape Navigator 2.0 or later). You can create an Assistant to represent each site you want to download regularly, and you can categorize and sort sites using Topics. When you install the program, it comes with a list of ten default Assistants (such as CNN), and Tierra Highlights lets you delete them or set their properties and statistics by simply right-clicking on each Assistant.

Right above the list of Assistants sit the Add Assistant, Assistant, and Program buttons. There you'll also find an icon for minimizing the interface, which you can then access by right-clicking on an icon in the Control Bar (located in the screen's lower right-hand corner). This bar shows how many changes have occurred in your chosen sites, if any.

Next to the Assistants are 3-D but-

SUMMARY OF FEATURES

Off-Line Browsers

PC MAGAZINE
EDITORS' CHOICE

■ YES ■ NO

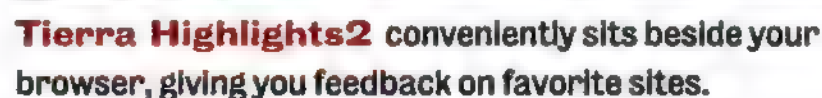
Products listed in alphabetical order

	Browser Buddy 1.2	Folio Web Retriever 2.1	FreeLoader 2.5 (beta 1)	InContext FlashSite 1.01	Lotus Webicator (beta 3.b.1)	NetAttaché Pro
Price	\$39.00 (list)	\$39.95 (list)	Free	\$35 (street)	\$29.95 (list)	\$49.95 (list)
Imports bookmark files	■	■	■	■	■ ¹	■
Identifies and retrieves refreshed sites	■	■	■	■	■	■
Stores passwords for protected sites	■	■	■	■	■	■
Allows limits on disk space usage	■	■	■	■	■	■
Allows limits on per-site downloading time	■	■	■	■	■	■
Allows one-time downloads	■	■	■	■	■	■
Allows hourly/daily/weekly downloads	■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■
Downloads multiple jobs simultaneously	■	■	■	■	■	■
Displays downloading statistics/time/URL	■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■	■ ■ ■ ■ ¹	■ ■ ■ ■
Searches sites for keywords	■	■	■	■ ²	■	■
Creates site map	■	■	■	■	■	■
Supports proxy server/firewall	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■
Builds table of contents of downloaded sites	■	■	■	■	■	■
Uploads messages to discussion areas	■	■	■	■	■	■
Integrates into:						
Netscape Navigator 2.0 or later	■	■	■	■	■	■
Microsoft Internet Explorer 3.0 or later	■	■	■	■	■	■
Supports client-side/server-side image maps	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■
Supports frames	■	■	■	■	■ ¹	■

(1) This feature is slated for the product's final release but was not available in the tested beta version.

(2) This feature is provided in a bundled add-on.

N/A—Not applicable: This product downloads only one page at a time.



they have links to the main page, it won't highlight those changes. But despite these drawbacks, Tierra Highlights2 offers a lot to like.—YK

highlighting, Tierra Highlights2 forms a border around updates.) The product also allows you to create keyword filters for highlighting or ignoring certain sections of a site.

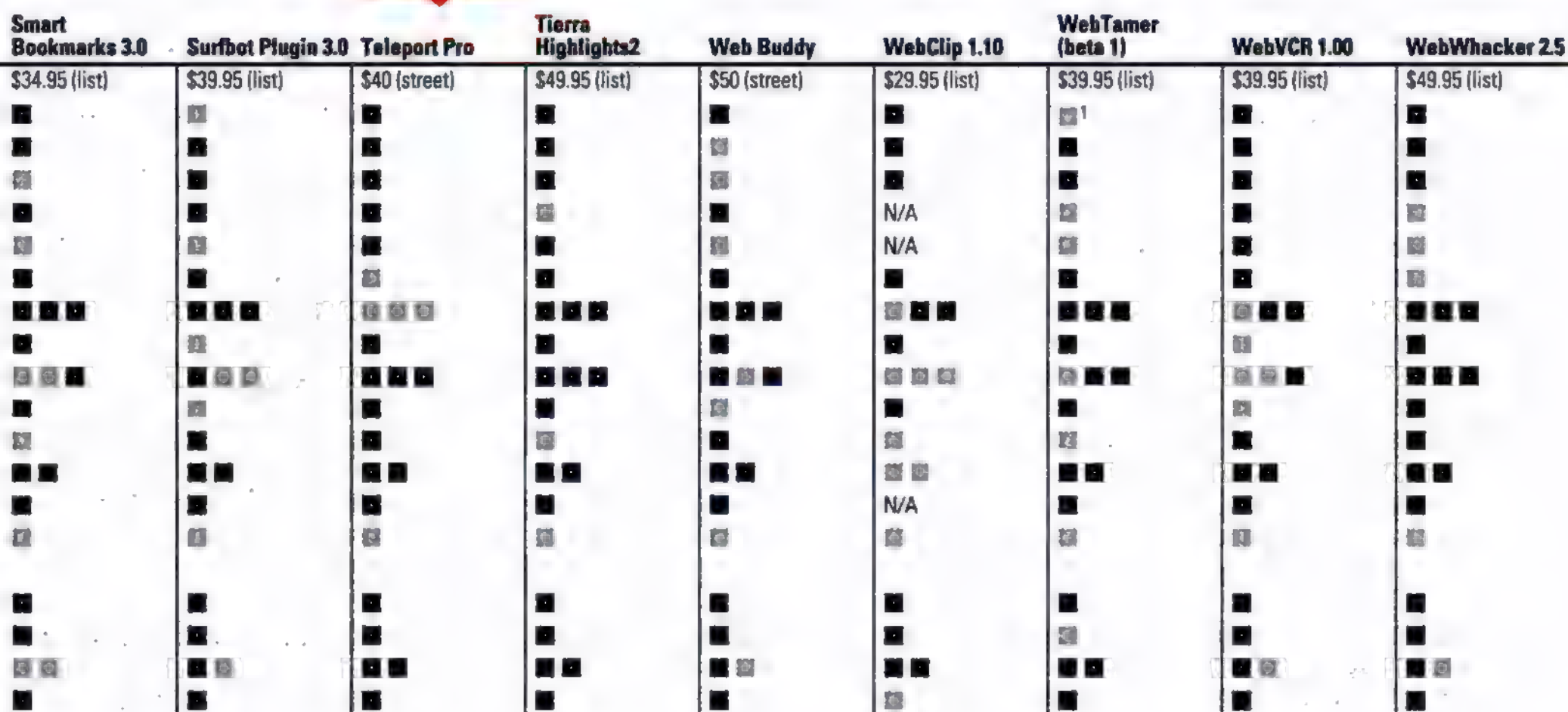
DataViz Inc.

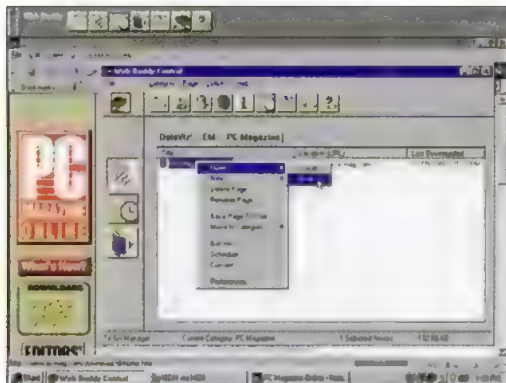
Web Buddy

If you want to be able to push a button while browsing the Web and download a remote page on the fly, you will want a copy of Web Buddy.

This program (\$50 street price) installs itself as a floating toolbar, which pops up when you launch your browser (Microsoft Internet Explorer 3.0 or later or Netscape Navigator 2.1 or later). When you find a page in your browser that you want to keep on disk, you click one of the icons on the Web Buddy toolbar, which lets you download the page and its graphics, sound, and other multimedia elements. You can also download the entire site or set up Web Buddy's internal scheduler for downloading specified sites or pages at intervals.

After downloading a page or site, you access it through Web Buddy's control panel application, which uses a tabbed folder metaphor. When you click on a page title, Web Buddy launches your browser so you can view the page; you can choose whether to open the copy of the page stored on disk or the remote Web version. You can convert pages into word processor files and schedule downloads from the





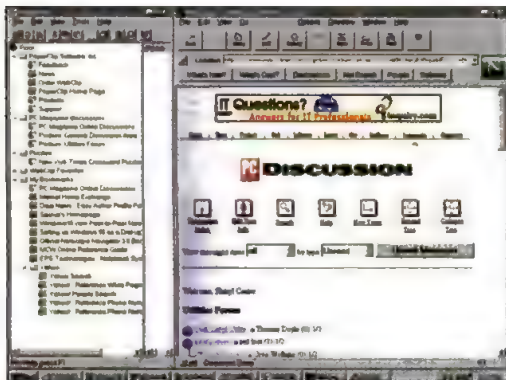
Web Buddy lets you open pages stored to disk or the "live" version online.

control panel. The program also performs the same kind of unattended retrievals that other off-line browsers do, but it stands out for its quick on-the-fly downloads of single pages either in HTML format or converted into a word processor format.

Don't expect complete accuracy from the file conversions; the program, for example, leaves out graphics when converting to WordPerfect. And though Web Buddy doesn't alter your browser setup, its toolbar competes for screen space with other programs' toolbars.

Although Web Buddy can't compete with the extensive text-search features of NetAttaché Pro or WebWhacker 2.5, it packs an impressive range of convenience features behind an easy-to-use interface.—EM

Web Buddy. Street price: \$50. Requires: 486-based PC or better, 4MB RAM, 3MB hard disk space, Microsoft Windows 95 or later. DataViz Inc., Trumbull, CT; 800-733-0030, 203-268-0030; fax, 203-268-4345; www.dataviz.com. **Circle 492 on reader service card.**



WebClip tiles the display of the catalog and your browser so you can see both at once.

PaperClip Software Inc.

WebClip

A beautifully designed off-line tool, Version 1.10 of WebClip adds support for Microsoft Internet Explorer 3.0 and for password authentication. WebClip currently can download only one Web page at a time, but the next release will let you drill down through the links and download an entire site.

The strengths of this product (\$29.95 list price) include its intelligently designed interface, a unique versioning feature for storing a site's content over time, and a background Agent that monitors whether sites have changed.

WebClip's dual-pane interface operates much like Windows 95 Explorer. The catalog, which is displayed in the left-hand pane, arranges folders, shortcuts, and documents in a tree structure, and WebClip displays a selected folder's contents in the right-hand pane. Each of the catalog items has an associated property sheet, where you can enter the item description, keywords, monitoring frequency, authentication information, and local or remote status.

When you launch your browser (Microsoft Internet Explorer 3.0 or later, Netscape Navigator 2.0 or later, or SpyGlass Mosaic 2.10 or later) from within WebClip, the two program windows are tiled so that you can simultaneously view them; integration between the windows is seamless. As you browse, WebClip conveniently uses local copies of sites when available. If you encounter a new site that you'd like to save, simply click the New Document icon.

WebClip's clean, object-oriented design is a pleasure to use. And its forthcoming drill-down support will give the product even more of an edge over the competition.—SC

WebClip 1.10. List price: \$29.95. Requires: 486-based PC or better, 16MB RAM, 10MB hard disk space, Microsoft Windows 95. PaperClip Software Inc., Hackensack, NJ; 888-493-2254, 201-487-3503; fax, 201-487-0613; www.paperclip.com. **Circle 493 on reader service card.**

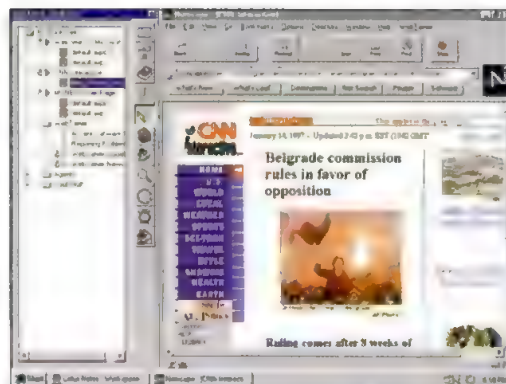
Accent Worldwide Inc.

WebTamer

More than an off-line browser, WebTamer is a suite of applications that help you find information on the Web and store and manage it.

We tested the first beta version of Accent Worldwide's \$39.95 (list) program, which is available as a free 30-day trial from the company's Web site. Slated to ship by the time you read this, WebTamer will be available both in a retail version and in software bundles with new PCs. A free "lite" version will also be available on Accent Worldwide's Web site.

Once you install WebTamer, you'll notice a globe icon on the Taskbar. By right-clicking on the icon, you can launch the WebTamer toolbar or update bookmarked sites that you have scheduled for periodic monitoring. In addition, when you launch your browser, the toolbar appears vertically next to the



The vertical toolbar provides quick access to all of WebTamer's functions, including agents.

browser window. And when you click on the WebFile function, WebTamer displays all of the cached information in its database. You can attach comments to downloaded pages and search the database by URL, title, folder, keyword, comments, and text.

The beta version that we tested does not automatically import Netscape bookmarks; instead, you drag and drop them into the WebTamer dialog box. The product has various scheduling options: updating a URL on command, at regular intervals, or when the pages' contents have changed.

In addition to providing traditional off-line browser features, WebTamer packs a host of innovative functions. The

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Optiquest V775
September 1996

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most powerful feature may well be AgentSoft's LiveAgent, which employs Java and JavaScript to automate tasks. In order to use it, you'll need Netscape Navigator 3.0 or later. (WebTamer's other features work with Navigator 2.0 or later, but this product does not work with Microsoft Internet Explorer.) LiveAgent is also available separately ("Agent Software," March 25, 1997).

On our tests, WebTamer suffered from some expected beta glitches: For example, sometimes it downloaded only a page's banner or appeared to be running even when no downloads were scheduled or taking place. Still, this product looks promising. Stay tuned. —John Morris

WebTamer. List price: \$39.95. Requires: 486-based PC or better, 16MB RAM, 12MB hard disk space, Microsoft Windows 95. Accent Worldwide Inc., Newport Beach, CA; 800-535-5256, 714-223-0620; fax, 714-223-0629; www.accentsoft.com. Circle 494 on reader service card.

NetResults Corp.

WebVCR

With a VCR metaphor for off-line browsing, WebVCR takes a unique approach. The results, though, may leave you frustrated.

The product's VCR terminology, for example—*play* for *browse*, *record* for *download*, and *tape* for *database*—is more confusing than clarifying. Even worse, WebVCR 1.00 (\$39.95 list price) forces you, as a VCR does, to shift between modes when you want to access different functions. Nevertheless, although this first

release is unstable at times, it offers a wide range of useful features. An update will be available by the time you read this.

Like other products reviewed here, such as WebClip, WebVCR displays database contents hierarchically in a tree structure. You can display, or "load," only one "tape" at a time. The Find option allows you to search a database for specific URLs or page names; in order to view a site, select it and then click the Play button. But you must enable Online Playback before you view remote Web sites; if you don't do so, your browser will display an error message.

You can set "recording" options within an item's Property sheet, including the search depth, the file types you want to retrieve, and whether to include off-site links. Scheduling options are flexible, and WebVCR handily downloads only modified sites for updating. It supports Microsoft Internet Explorer 2.0 or later and Netscape Navigator 2.0 or later.

After the program "records" a multi-level site, it adds a new option—Stop Here—to the start page's context menus of site content. This useful feature (which is difficult to find in the program's Help file) lets you skip a specified site level and every level below it during the next update. All in all, if you don't mind the VCR metaphor, WebVCR is a capable choice for off-line browsing.—SC

WebVCR 1.00. List price: \$39.95. Requires: 486-based PC or better, 8MB RAM, 2MB hard disk space, Microsoft Windows 95 or Windows NT 3.51 or later. NetResults Corp., Palo Alto, CA; 415-473-3933; fax, 415-473-3934; www.netresultscorp.com. Circle 495 on reader service card.

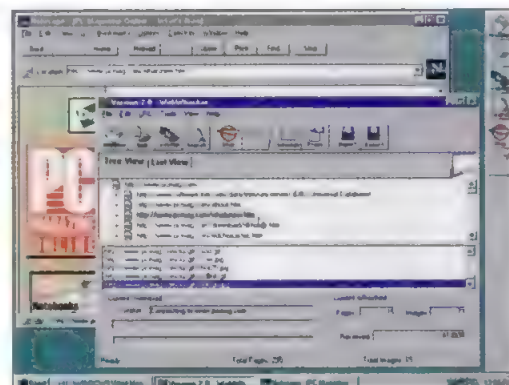
The ForeFront Group Inc.

WebWhacker

A Web page retriever designed to let you view remote pages off-line exactly as if you were viewing them online, WebWhacker 2.5 lets you see the remote address of the file you're actually reading on your disk.

When you click on the name of a downloaded page in the control center of this program (\$49.95 list price), it dis-

plays the page in your browser. Even though your browser (any one you choose) is reading the page from your disk, the page address in the browser's Location box is the address of the remote page.



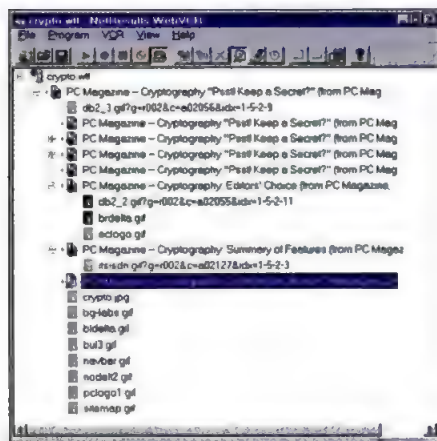
WebWhacker displays a highly detailed list of the pages it downloads.

You can configure WebWhacker so that if you click on a link, your browser connects to the Internet to follow the link and tells you if the server is unavailable. But WebWhacker doesn't indicate on-screen that you're viewing a version of the page that may be older than the one on the remote site.

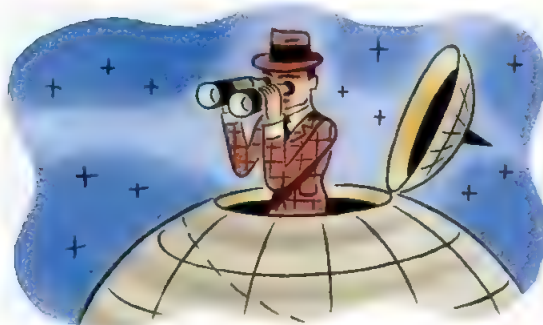
WebWhacker offers solid staples to off-line browsing. To wit: You can organize pages in WebWhacker's database according to categories of your choice, and you can also perform Boolean searches through an entire database or through individual categories. You can download items such as sound and other multimedia, as well as export pages from the database as HTML files. But you may also find the scheduling feature confusing, as the dialog box that controls the URL and its update times can differ with what you've specified in the general preferences dialog.

Essentially, WebWhacker gets the job done. At times, though, it's less flexible than some rival products. Its exact imitation of online viewing proves both problematic and advantageous.—EM □

WebWhacker 2.5. List price: \$49.95. Requires: 486-based PC or better, 4MB RAM, 10MB hard disk space, Microsoft Windows 95 or Windows NT 3.51 or later. The ForeFront Group Inc., Houston; 800-475-5831, 713-961-1101; fax, 713-961-1149; www.ffg.com. Circle 496 on reader service card.



WebVCR uses a tree hierarchy to display the files in a site you've downloaded.



internet

OFF-LINE search utilities

Who has time to hang around on the Web, even for important information searches? Fire up an off-line search tool and let *its* fingers do the walking. *By Edward Mendelson*

You can search for data on the Internet in two ways. The slow way is to use your browser for visiting search engines one by one, as you work your way from AltaVista to Yahoo! and everywhere in between. The fast way is to use a special program—an off-line search utility—that submits your searches to multiple search engines with a single command and gathers the results into a list.

When you send such a search query to multiple search engines, you perform a *metasearch*. The first job of the programs reviewed here is to translate your search request into the varying syntaxes expected by all the different remote search engines. Then they transmit the request to the engines and receive, sort, and index the responses sent by each of them.

Some metasearch programs don't just receive the list of addresses from the search engine but return to the Web to test whether the addresses still exist. Other programs download the full text of the reported pages and prepare an index that you can consult off-line. These programs overlap in function with off-line browsers, reviewed elsewhere in this issue.

When you want to read the pages found by metasearch, you'll see that most programs launch your default browser—either Microsoft Internet Explorer or Netscape Navigator. You can use the browser to follow hyperlinks on the page.

Many of these programs keep

a search command together with the addresses and text received from remote search engines and remote pages. Thus you can repeat the search either on a regular schedule or on command. The programs also generally report whether any previously received pages have changed or whether any new ones are reported by the search engines.

Before using any metasearch program, you should spend some time visiting each of the supported search engines in your browser to learn more about how each engine works and the range of data it indexes. Some engines support Boolean and other refinements in the queries you submit; others accept only single words.

There used to be a market for CD-ROMs that contained a subset of a Web-based search engine so you could search off-line more quickly and cheaply than online. But the CD-ROMs often took longer and contained only a small, outdated portion of a database. Only two products here still do this.

Finally, as the Web becomes more tightly integrated with local networks and your hard disk, these programs will evolve into integrated data-retrieval utilities for finding files anywhere. Someday, you may not notice whether the data you open in an application came from your hard disk or from 10,000 miles away. These programs take the first step toward that day.



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SUMMARY OF FEATURES

Off-Line Search Utilities



■ YES ■ NO

Products listed in alphabetical order

	Corel Internet Mania	CyberSearch 3.0	EchoSearch	Internet FastFind	WebCompass 2.0	WebSeeker 2.2
List price	\$24.95	\$99.00	Free	\$49.95	\$49.00	\$49.95
Search engines supported	1	6	8	8	35	23
User can add search engines	■	■	■	■	■	■
Search Options						
Queries multiple search engines simultaneously	■	■	■	■	■	■
User can search returned results off-line	■	■	■	■	■	■
User can search local hard disk/network	■	■	■	■	■	■
User can refine query for reuse	■	■	■	■	■	■
Returns						
Eliminates dead links	■	■	■	■	■	■
Creates summaries of found pages	■	■	■	■	■	■
Sorts results by relevance/concept	■	■	■	■	■	■
Extended Features						
Monitors Web pages/FTP sites/gopher servers	■	■	■	■	■	■
User can import Netscape Bookmarks/Microsoft Favorites	■	■	■	■	■	■
User can schedule searches	■	■	■	■	■	■

Corel Corp.

Corel Internet Mania

It's more utilitarian than maniacal, but if your Internet-searching needs are simple and straightforward, Corel Corp.'s \$29.95 collection of miscellaneous Internet programs—Corel Internet Mania 1.0—gets the job done easily. The CD-ROM contains a subset of the Lycos database and miniature utilities for searching either the disk-based subset or the much larger on-line version.

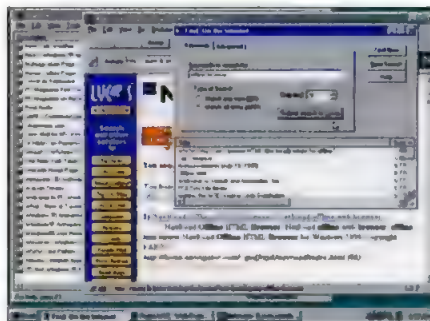
Other utilities scan message headers in selected newsgroups for specified text, monitor Web pages for changes, and download stock quotes from the Internet for display on your screen. You also get a personal Web server and a program that builds simple HTML pages using on-screen icons. None of the programs are linked to one another, and each has a different interface. But all are easy to use, and when you minimize them, they become tiny icons in the system tray instead of cluttering the taskbar.

The Web-search program works only with the Lycos search engine. The option to search the live, online Lycos database is more useful than the one to search the subset on CD-ROM, because the CD-ROM file is so small, and because the November 8, 1995, file is relatively old.

When you search the disk-based database, a list of hits appears in a window. A click on any title opens the corresponding page, if it still exists, in Navigator or Internet Explorer according to your prefer-

ence. When you search the online database, the utility opens the results page in your browser, and you follow the Lycos list of search hits from links displayed in the browser window.

The utility that checks news readers doesn't pretend to be a full-scale off-line reader, but it's useful for simple reports of



Internet Mania displays search hits from its disk-based Lycos catalog in its own window.

new messages on topics that interest you. You create simple rules that specify one or more newsgroups to check, and the text to search for in the subject header. The help file, though, misleadingly suggests that the program scans the actual message text, not just the header.

The main window displays a list of matching messages and displays them either in your browser or in Corel Internet Mania's internal reader. You can tell the program to use its internal reader only for messages no longer on the server. You can specify only one server, and the program

won't work with servers that require passwords (although a Test button tells you the program is connected to such a server).

When you use the attached utility to monitor remote pages, you can specify that any individual page be checked on a schedule or only on command. The list of sites can't be organized into categories. A pop-up menu for each site displays the header of the remote page, and an option saves the text (not graphics) of the entire page to disk. When you double-click on an item in the list of monitored sites, the page opens in your browser. The on-disk version of the page displays if Internet Mania downloaded it. Otherwise, the browser opens a live version on the Web.

Internet maniacs will prefer more elaborate programs. But many users will find this package's Web page and newsgroup monitor exactly suit their needs. **Corel Internet Mania 1.0.** List price: \$29.95. Requires: Microsoft Windows 95 or Windows NT 3.51 or later. Corel Corp., Ottawa, Ontario, Canada; 800-772-6735; www.corel.com. *Circle 464 on reader service card.*

Frontier Technologies Corp.

CyberSearch

CyberSearch 3.0 can find data on your hard disk, your network, and the World Wide Web. This \$99 search utility, from Frontier Technologies Corp., combines four elements into a single data management system. Unfortunately, you must access its

unique and impressive feature set through a complex and unhelpful interface.

The first, most visible element is a tabbed organizer for your bookmarks, search agents, and catalogs of useful sites. A preview pane displays the opening lines of the page whose bookmark is currently selected in the bookmark list.

The second element is a wizard that launches Internet metasearches using one or more major search engines. The third is the Verity search engine, which works behind the scenes to produce full-text indexes of files on your local hard disk or network and to index the opening lines of search-detected remote Web pages. The fourth element is a bookmark monitor that reports changes on one or more remote pages.

You can perform quick searches from a toolbar or create search agents in a special tabbed folder listing your agents. The result of each search is a list of bookmarks in a folder with the agent's name on the tab. You can drag additional bookmarks into the folder from Navigator or Internet Explorer, and you can launch stored ones in your browser by double-clicking on them.

The content of the page is not stored on your disk except for the few hundred characters that display in the preview pane. The user decides how many characters to download, and because the program checks each page, invalid links are discarded automatically. A subset of the Lycos database comes on the CD-ROM, and you can update the supplied catalogs by connecting to Frontier's Web site.

The CyberSearch interface could stand improvement. Before you can run an Internet search through more than one search engine, you have to save a named profile of selected search engines to your

Editors' Choice

• Internet FastFind



You expect to save time and trouble by using an off-line search tool for your important searches over the Web. Otherwise, why would you bother? Thus, such

a tool should give you lots of options, and it must include a good interface to make the package easy to use. In this roundup, Symantec Corp.'s Internet FastFind offers you the best such combination.

FastFind delivers the most complete set of components. It includes tools for searching the Web and FTP sites, monitoring changes in Web sites and FTP directories, launching your favorite pages, and managing search files.

The interface for the components is made up of easy-to-follow dialog boxes and drop-down menus. The built-in alerts are sufficient without being too obtrusive. And although price was not really an issue among these well-priced utilities, FastFind is more than in line with the rest of the packages here for everything it delivers.

We also give an honorable mention to EchoSearch 1.07, which does many of the things you're looking for in such a utility.

disk. You can choose a profile only by name; you can't see which engines are included in a profile at the time you select it for a search. And you can't add new engines to the ones built into the program.

In addition, CyberSearch inconveniently won't let you modify or rename an agent from its own tabbed folder. Instead, you must find the folder that contains the list of all your agents and make your changes there. You can't schedule an unattended search, although you can schedule nightly updates to the index of locally stored bookmarks.

Nor can you tell the program to find a specific word or string in your most recent search results until it indexes the results, which is a slow process. The program lets you specify searches and remote sites that it will monitor when it starts up, but all other monitoring has to be done by hand.

CyberSearch badly needs improvements to its interface and its obscure help files, but it's the only package on the market that indexes your own disk in addition to the riches of the Internet. Version 4.0, scheduled to be in beta as you read this, will address some of these issues.

CyberSearch 3.0. List price: \$99. Requires: Microsoft Windows 95 or Windows NT 3.51 or later. Frontier Technologies Corp., Mequon, WI; 800-929-3054, 414-241-4555; fax, 414-241-7084; www.frontiertech.com. Circle 465 on reader service card.

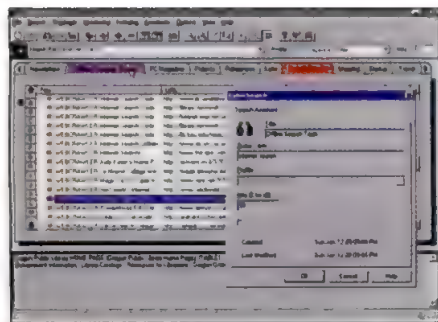
Iconovex Corp. **EchoSearch**

Unlike all other Internet metasearch tools, EchoSearch both downloads data from the Web and organizes it so you can use it. Version 1.07, available free to anyone who downloads it from Iconovex Corp.'s Web site, may make you think twice before spending money on elaborate packages that lack its unique features.

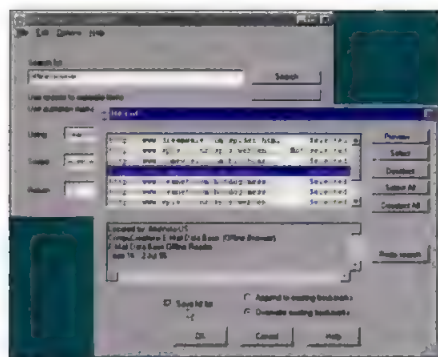
EchoSearch performs Boolean or simple searches through the major Internet search engines, downloads the pages that match your search, and then indexes and linguistically analyzes the pages. When the index is complete, EchoSearch launches your browser and lets you view four different index pages, each with links to the downloaded Web pages.

Each index uses a different set of keywords. One uses only the words in your query as keywords; another uses concepts extracted from the downloaded pages through linguistic analysis; a third uses all significant terms in the pages; and the fourth displays summaries of each downloaded document, using summaries extracted by EchoSearch. You can refine these indexes by adding search terms to an existing search and telling the program to generate new, more detailed indexes that add your new terms to the old keywords.

A minimal yet elegant interface lets you specify which engines you want to in-



CyberSearch's tabbed folders help you store your Internet search results.



EchoSearch lets you review the list of search hits before it downloads the pages.

clude in your search. If you attempt a phrase search in an engine that doesn't support it, the program simply skips that engine. An option lets you prune the list of URLs reported by the search engines before the program downloads them to disk.

When the program processes a downloaded page, it adds anchors that link the page to the various indexes, plus a link that tells your browser to go to the Web to display the remote page in its original form. The program rewrites links between downloaded pages so that you can open the linked page from the copy on your hard disk instead of going out to the Internet for it. A menu option lets you save the complete set of indexes and downloaded pages to disk for browsing at a later time.

In compiling an index of concepts, EchoSearch uses a public-domain database of related words. After the program downloads the pages that match an Internet search for *dogs*, for example, it will generate an index that includes terms such as *collie* and *husky* if those terms are found on the downloaded pages, even though the program did not explicitly request pages with those terms when searching.

As tested, Version 1.07 lacks a built-in scheduler, won't list search hits in order of relevance, and doesn't let you add search engines. Version 2.0, due out by the time you read this, will add all these features and will cost \$29.95—a bargain price for a uniquely intelligent program.

EchoSearch 1.07. List price: Free. Requires: 5MB hard disk space; Microsoft Windows 95 or Windows NT 3.51 or later. Iconovex Corp., Bloomington, MN; 800-943-0292, 612-896-5100; fax, 612-896-5101; www.iconovex.com. *Circle 466 on reader service card.*

Symantec Corp. **Internet FastFind**



No other package gives you as many Web-related conveniences in one interconnected bundle as Internet FastFind. This \$49.95 package, from Symantec Corp., includes eight components for searching the Web and FTP sites, monitoring changes in Web pages and FTP directories, launching your favorite Web pages from the Microsoft Windows 95 or Windows NT 4.0 taskbar, managing .ZIP files, and updating Internet FastFind and other software on your disk. None of these components stand out from rivals in their depth of features, but together they make for a solid package.

The metasearch feature, WebFind, consists of a two-tab dialog box in which you enter a search string and specify whether you want search hits that contain all or only some words in the string, or an exact phrase. Support for eight major search engines is built-in, and you can deselect the ones you don't want. If you specify an exact-phrase search, WebFind simply skips over the engines that don't allow them. An option filters out links to nonexistent sites.

Search results are displayed on a summary list in Netscape Navigator or Internet Explorer, sorted either according to the highest relevance or with pages found by each search engine grouped together. When you click on a page title in the summary list, your browser goes out to the Internet to find the page itself. WebFind stores searches on a most-recently-used list, and earlier searches are cleared automatically from the list as it fills up. You can't save your searches to disk for later use.

To monitor remote pages, whether or not you found them in WebFind, you display each page in Navigator or Internet Explorer and click on a Notify button that Internet FastFind attaches to the browser's title bar. A drop-down menu then gives you the option of monitoring the file on a schedule or on command. You're alerted to changes by a flashing taskbar icon or a pop-up menu, and the changed page can be saved to disk. You also can access Notify as a standalone application and have it alert you to changes in folders on your disk or network.

Other components include a separate

Easy FTP module that lets you copy files from remote sites in the same way you drag files between folders in Explorer. The .ZIP manager displays the contents of .ZIP archives in an Explorer window and lets you extract the contents by dragging their icons out of the window. The module that updates drivers and applications on your disk supports too few programs to be useful.

The installation procedure loads everything in the package onto your disk and enables all functions, whether you want them or not. You must use the program's control panel to turn them off. Internet FastFind doesn't pretend to be a



Internet FastFind lets you specify the length of time it will devote to a search.

professional-level data-gathering tool, but you won't find its wide range of useful features in any other unified package.

Internet FastFind. List price: \$49.95. Requires: 8MB hard disk space; Microsoft Windows 95 or Windows NT 4.0 or later. Symantec Corp., Cupertino, CA; 800-441-7234, 541-334-6054; fax, 541-334-7474; www.symantec.com. *Circle 467 on reader service card.*

Quarterdeck Corp. **WebCompass**

WebCompass 2.0 searches every obscure cranny of the Internet for data, which it then indexes at top speed on your hard disk. The elaborate multipane interface in this \$49 package from Quarterdeck Corp. lets you scan vast amounts of downloaded data with a minimum of effort. The data it displays are not the remote Web pages themselves but rather data extracted from those pages. So if WebCompass's modus operandi of extracting keywords and summary paragraphs appeals to you, then you'll find this an effective program.

To get started, use a wizard or the tool-

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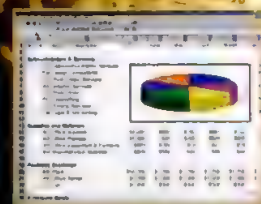
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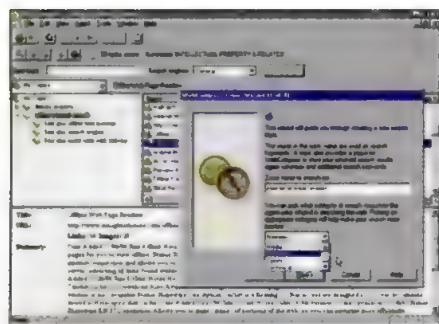
*Quote from PC Computing Dec 1996. **Estimated street price for 4 MB. All performance tests conducted by Matrox Graphics Inc. on a Dell Dimension XPX Pro 2000Hz system with 32MB of EDO DRAM and 256K of cache. WinBench 97 Business Graphics conducted at 1024x768 @ 24bit with 75Hz vertical refresh under Microsoft Windows NT 4.0. Matrox Millennium, ATI 3D Pro Turbo, PC2TV, Diamond Stealth 3D 3500 and NVIDIA GeForce 256 were configured with 4MB of memory for the PCI bus using driver release 3.00, 3.03, 2.01 and 2.21 respectively.

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bar to create topics, which consist of one or more words and a set of search engines. The program goes out to the Web, queries the selected search engines, downloads the text on every remote page found by the search engines, and extracts a summary and set of keywords for each page.

The results appear in a three-part window. One pane displays a tree-structured list of topics, with those in which the program has found new data highlighted in yellow. You define subtopics under each topic by selecting from a keyword list. All pages within a topic matching these keywords become part of the subtopic.

A second pane displays a list of URLs that match each topic and subtopic; newly detected or changed pages are indicated. If you click on an address, your browser—



WebCompass's topic wizard lets you select search terms and search engines.

either Netscape Navigator 3.0, Internet Explorer 3.0, or a later version—fires up and locates the page on the Web.

A toolbar button lets you tell the program to find pages linked to the highlighted page and add them to the list of pages in the current topic. A preview pane at the foot of the screen displays the summary and keywords extracted from the page and highlighted in the list pane. Add your own annotations beneath the preview.

A separate window lets you search the database in which the program stores all its downloaded data and drag the pages found by the index to any other topic in the topic tree. The index uses the standard Microsoft JET database engine, so it can be manipulated from Microsoft Access.

Searches can be repeated on a schedule or command, and you can specify one interval at which the program will search for new pages and another at which it will rescan and reindex all pages that match the search. WebCompass doesn't discard

invalid links but merely reports in the list pane that a page could not be found. You can try to retrieve it at any time. Once you delete an irrelevant page, though, WebCompass won't retrieve it again.

WebCompass supports 32 search engines and lets you add more. No other metasearch tool is as flexible. But when you select a subset of engines for searching, WebCompass rigidly makes you select a named set, which you can't modify on the fly—and worse, you must rename the same engine to use it in more than one set. But this is a minor annoyance in an otherwise flexible and powerful program.

WebCompass 2.0. List price: \$49. Requires: Microsoft Windows 95 or Windows 3.51 or later. Quarterdeck Corp., Marina del Rey, CA; 800-354-3222; www.quarterdeck.com. Circle 468 on reader service card.

The ForeFront Group Inc.

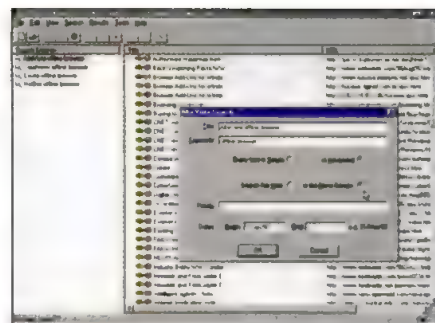
WebSeeker

With a rather complex interface and some search-engine limitations, this \$49.95 metasearch tool from The ForeFront Group is not as full-featured as other products reviewed here. But WebSeeker does retrieve the addresses or full text of Web pages located by as many as 25 Internet search engines. Then it creates indexed reports of the full downloaded text and displays the reports in Internet Explorer or Navigator.

On each page, the string you searched for is marked on both sides by navigation buttons that let you jump instantly to the next occurrence of the string. Although the page displayed in your browser is located physically in WebSeeker's database on your disk—and therefore can be viewed off-line—the links on the page are live, so your browser can connect to the Internet and follow the links to remote pages.

You start a search from a tabbed dialog box, in which you enter the search string and select one or more search engines. You can manually specify any subset of WebSeeker's supported engines in a search, but you can't save a subset list to disk to reuse it in the future.

You use the same dialog box to decide whether you want WebSeeker to perform its fully indexed search, which generates an index of the remote pages, or whether you want it to perform a faster search that downloads only the addresses of remote pages located by search engines. If you



WebSeeker lets you specify the same precise queries as when you visit a search site.

choose this faster search, you can't view the contents of a remote page off-line. Instead, you click on the page's name, and your browser connects to the Web and displays the page without the navigation buttons WebSeeker adds for its full search.

Search results can be refined by adding search terms, then saved to disk for future use. Individual remote sites can be marked for monitoring using a built-in scheduler. A unique feature lets you apply the precise controls over a query made through WebSeeker that you can apply when you submit a query directly to a search engine through your browser.

When you're querying AltaVista, for example, you can submit a search of newsgroups instead of Web pages, and you can limit the search by date. Similar refinements are offered for other supported search engines. You can't add search engines to the ones the program already supports, however. But WebSeeker optionally checks out ForeFront's Web site at scheduled intervals to download new support files for existing and newly created engines.

Unlike ForeFront's WebWhacker (reviewed in this issue), which stores downloaded pages in a proprietary database, WebSeeker stores pages as standard HTML files. Its index is in XBase format and can be manipulated by any database software. WebSeeker can't produce the kind of full-text index generated by EchoSearch, but if you want to zero in on a few search strings in a wide variety of Web pages, it gets the job done effectively. □

WebSeeker 2.2. List price: \$49.95. Requires: 10MB hard disk space; Microsoft Windows 95 or Windows NT 3.51 or later. The ForeFront Group Inc., Houston; 800-653-4933; fax, 713-961-1149; www.ffg.com. Circle 469 on reader service card.

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PC Computing Dec '96.

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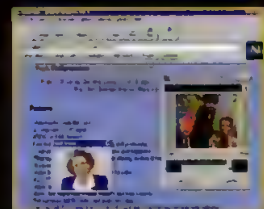
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January 1997



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* Estimated street price for 2 MB. All performance tests conducted by Matrox Graphics Inc. on a MMX 200MHz system with 32MB of EDO DRAM and 256K of cache. WinBench 97 Business Graphics conducted at 1024x768@60Hz with 75Hz vertical refresh under Microsoft Windows 95. Matrox Mystique, ATI 3D Xpress, PC2TV Diamond Stealth 3D 2000XL and STB Velocity 3D were configured with 4MB of memory for the PCI bus using driver release 3.30, 3.03, 4.84.00.2104 and 1.240 respectively. Microsoft Tunnel test run at full screen 640 x 480 resolution with 16-bit color at default manufacturer refresh rate based on Gouraud shading, perspective correct textures, point sampled and z-buffer.

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*10/31/96 evaluation by Ron Jarmuth, Chief Automation Technology Branch, HQDA-IMCEN, Pentagon Automation Technology Branch. Kingston Technology Company, 17600 Newhope Street, Fountain Valley, CA 92708 USA, (714) 435-2600, Fax (714) 435-2699. © 1996 Kingston Technology Company. All rights reserved. Kingston is a registered trademark and Computing Without Limits and TurboChip are trademarks of Kingston Technology Company. Windows NT is a registered trademark of Microsoft Corporation.



internet

FILTERING utilities

The Internet can be a wonderful resource for your children, but it has its dark side, too. Monitor and control your kids' online activity with one of these seven tools. *By Kathryn Munro*

The Internet, while a virtual sea of knowledge, is also a barrier-free abyss, with a dark and seamy side. There's help out there for protecting your children from what you don't approve of with one of these software utilities.

We tested seven filtering tools that give parents the power of censorship, while leaving the rights of other Internet users intact. These tools don't take the place of vigilance or simple common sense but allow parents to give their children the freedom to explore the Internet in relative safety. Although not our focus here, many of these tools also can be used in a business environment to increase productivity and reduce exposure to unwanted material.

The tools reviewed range from simple to extremely complex. If you want to install a program and not be bothered with elaborate configuration routines, you can do so with products such as Surf-Watch and X-Stop. On the other hand, you accept the challenge of an involved setup routine with a product such as Cyber Patrol or Rated-PG. In return for the effort, you can filter the Web, chats, and e-mail, as well as many applications. You also can set timing devices that give you control over how much time your kids spend on the computer. You can monitor your child's activity in the background, logging sites visited and time spent using different applications.

During testing, we concentrated primarily on the installation process, the features offered, and the ease of use of the features included. Although we tested how well each product filters words and sites, we suggest that what one person considers objectionable may be perfectly acceptable to another. So, we took a close look at how easy it is to modify each product's Allow and Block lists according to individual beliefs. Parents should be able to allow or block material as they wish, and not have a value system imposed on them by the program.

How do these programs block specific words and sites? They monitor the data stream coming from the network (TCP/IP packets), analyze what is typed (keyboard buffers), and look at what's displayed (screen). At press time, X-Stop was the only product here that didn't monitor the Winsock, instead relying on keyboard, screen, and Clipboard data. But X-Stop is planned to support Winsock 2.0 when it ships.

All of the products performed well in their areas. Our experience, however, is that a foolproof filter list is impossible to develop because of the subjective nature of what is considered objectionable, as well as

the continually changing Internet. Nevertheless, these products can be a valuable tool in the process of parental monitoring of a child's computer activity.



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Internet Filtering Utilities

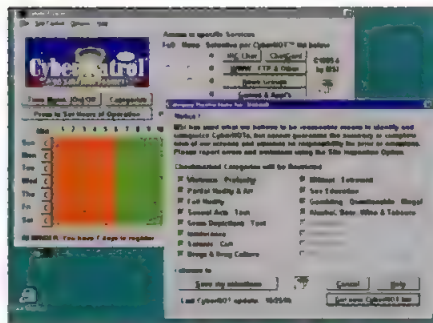
Microsystems Software Cyber Patrol



The most powerful package families can use to safeguard their children, Cyber Patrol 3.1 (\$29.95 list, including a three-month subscription to the Cyber NOT list) offers a wealth of highly customized features to control online and off-line computer usage. For the average user, however, the complexity of setup may be tough to handle.

Cyber Patrol lets you set restrictions for up to ten users with its Cyber NOT and Cyber YES site and word lists, the PICS rating standard, and your own customized changes. The NOT list, selected by a team of parents and educators, is divided into a number of useful categories, such as WWW, FTP, newsgroups, IRC Chat, games, and applications. The categories are rated to a fine level of precision for objectionable content, including nudity, sex, cults, drugs, violence, gambling, sex education, alcohol, and tobacco. You can receive weekly updates to the lists by subscription.

This program also includes a very granular time management system to monitor online and off-line activity. Al-



Cyber Patrol lets the users set specific filters based on ratings by a team of parents and educators.

though you can't track specifically where users have gone online, you can track such things as bypass (times the program was shut down and avoided) and total usage of the computer.

The ChatGard option keeps personal information, including names, addresses, and phone and credit card numbers, from being sent online by replacing the words and character strings with x's.

You will definitely need the help and READ.ME files for the time-consuming setup routine. Cyber Patrol features lots of functionality, but be prepared to work to extract the product's full potential.—
Kathryn Munro

Cyber Patrol 3.1. List price: Online registration, \$29.95; subscriptions: six months, \$19.95; one year, \$29.95. Microsystems Software, Framingham, MA; 800-828-2608, 508-879-9000; fax, 508-626-8515; www.cyberpatrol.com. **Circle 475 on reader service card.**

Solid Oak Software Inc. Cybersitter



Targeted primarily at pre-teens and young teenagers, Cybersitter 2.1 (\$39.95 list), from Solid Oak Software, effectively and unobtrusively logs Internet activity and blocks inappropriate material. Cybersitter's free daily updates, customized settings, and context-sensitive phrase filtering make it an ideal tool for parents to restrict the areas of the Internet that cause the greatest concern.

The product blocks three preset groups: WWW and FTP sites, Usenet newsgroups, and individual words and phrases. In each of the categories, you can block access, log hits, or both. Cybersitter also supports the PICS-compliant ratings systems, RSAC, SafeSurf, and Solid Oak's own Voluntary Content Rating system (VCR).

In addition, you can create a custom list of words and phrases to prevent your home address or phone numbers from being transmitted. The context-sensitive phrase filtering lets you enter groups of words in sequence to block inappropriate transmissions.

If a child tries to search for offensive

SUITABILITY TO TASK

Cyber Patrol

	Power	Ease
Standard configuration	Fair	Fair
Customization	Excellent	Good
Local monitoring	Excellent	Good

SUITABILITY TO TASK

Cybersitter

	Power	Ease
Standard configuration	Excellent	Excellent
Customization	Good	Excellent
Local monitoring	N/A	N/A

INTERNET FILTERING UTILITIES

How to Read the Suitability to Task Boxes

Standard configuration This task includes installation and uninstallation. The product should provide word and site lists, with frequent online updates, preferably for free. Users should have access to the lists' content and be able to add sites, words, and personal information quickly. Products that enable the most power with a minimum of setup concerns received higher ratings.

Customization Each utility should allow configuration for multiple users. Restrictive lists should feature various categories, preferably with multiple levels of protection within each. The product should

SUITABILITY TO TASK

Product Name

	Power	Ease
Standard configuration	Poor	Fair
Customization	Good	Good
Local monitoring	Excellent	N/A

N/A—Not applicable. The product does not have this feature

support both restrictive lists, which block specific content, and exclusive lists, which block everything except certain sites. The ability to change passwords and to configure a master user is helpful. The parent should have a great deal of flexibility in

determining the content to monitor, both online and off-line. Products that give parents a values-independent filtering system with minimal setup difficulty received higher ratings.

Local monitoring This category covers the product's ability to filter out words on local applications. Parents should have time management options for monitoring Internet, application, and total PC usage. They should also be able to limit the time spent using any application. The program should be able to issue a variety of warnings and even shut down an application if necessary.

Editors' Choice

- Cyber Patrol 3.1
- Cybersitter 2.1



Screening utilities have evolved along with the Internet. No one tool will meet everyone's needs, but Cyber

Patrol 3.1, from Microsystems Software, and Cybersitter 2.1, from Solid Oak Software, come closest. Cyber Patrol gives parents full control and is extremely versatile. It should be the first choice for those families willing to spend extra time to get their filtering system up and run-

ning. No other program featured as complete a package for filtering children's Internet access, as well as managing overall time spent on the computer.

Cyber Patrol offers a fine level of granularity in both its filtering and its monitoring capabilities. The program categorizes its restricted lists both by types of application, such as newsgroups, and by type of offensive content, such as drugs. The monitoring application lets you track online and off-line activity and gives you such information as how many times the program was shut down and avoided.

Cybersitter delivers a powerful tool for monitoring your children's online activity. It features free daily updates to lists so your product stays current, as well as context-sensitive filtering for letting the good stuff through and blocking the offensive with general search queries. Cybersitter also may be the easiest program to set up, and it runs in the background of your system without notice.

Net Nanny deserves an honorable mention for its monitoring features for both online and off-line activity.

words (such as the seven words you can't say on television), the search won't return any sites. If you search on more ambiguous words (say, *girls* or *drugs*), Cybersitter's smart filtering allows sites on topics such as girl scouts or pharmaceuticals to be displayed, but blocks pages containing offensive content.

During our testing, Cybersitter worked extremely well, only occasionally blocking good sites with bad-sounding URLs (for example, an Engineering site with "BourbonStreet" in the URL). When a child tries to access a restricted site, Cybersitter either will deliver a DNS error or a customized message from the parent.

If a child gets into a newsgroup or Web site that isn't blocked, Cybersitter blanks out offensive words, making descriptive messages look like a Mad Libs page. The list of restricted Web sites, newsgroups, and adult chat lines is updated daily as a free download. You can't edit the restricted list, but the company promises an override feature in a

future version.

Installation is simple, with the hardest question asked being your e-mail address and the name of your SMTP server (optional at setup time, but required later for updates).—*Jay Munro*

Cybersitter 2.1. List price: \$39.95. Solid Oak Software Inc., Santa Barbara, CA; 800-388-2761, 805-967-9853; fax, 805-967-1614; www.solidoak.com. Circle 476 on reader service card.

Pearl Software Inc.

Cyber Snoop

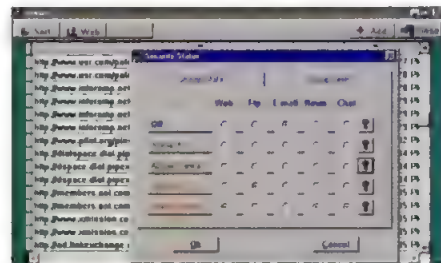
If you want to evaluate what your child is viewing online and create your own lists to limit access, Cyber Snoop 2.0 (\$29.95), from Pearl Software, is the tool for you. A stealth utility that records every move your child makes on the Internet, it provides no preset lists of restricted sites but offers many customized features for on-line activity.

Cyber Snoop tracks IRC chat, e-mail, FTP, Usenet, and Web activity and saves it in an Activity Log that looks and feels like a database. Each entry is displayed by source, URL, e-mail sender, and the date and time.

Using the log, a parent can sort entries by keyword, date, e-mail, Web, FTP, newsgroups, or chat sites. You can view the text as well as the encoded binaries of anything that your child receives or sends over the Internet. The Web button generates an HTML Quick Link page within your browser, and if you're connected to the Internet, the button generates hyperlinks to take you directly to any site in question.

Cyber Snoop lets you create separate Allow and Block lists for each of the five sources it monitors. You can allow full access, block all access, block access only to listed sites, or allow access only to approved sites from each source, but logging is universally either on or off.

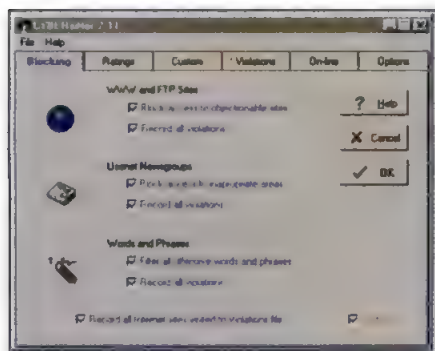
This product can import and export text files from either list and also export the Activity Log into the Allow or Block lists to use as filters. On request, Pearl will



You can create restrictions in Cyber Snoop manually or from online logs.

also supply a list of more than 1,800 Not Recommended sites that can be imported into the filter.

While Cyber Snoop does not mask or block words and requires you to create your own filter lists from scratch, it is one of the more flexible filters we've seen in this roundup. If you want to know where your children have been as well as protect them from inappropriate material, Cyber



Cybersitter can block objectionable sites, log all hits, and track all Internet activity.

SUITABILITY TO TASK		
Cyber Snoop		
	Power	Ease
Standard configuration	Fair	Good
Customization	Good	Good
Local monitoring	Good	Good

SUMMARY OF FEATURES

Filtering Utilities

■ YES ■ NO

Products listed in alphabetical order

PC MAGAZINE
EDITOR'S CHOICE

PC MAGAZINE
EDITOR'S CHOICE

Cyber Patrol 3.1 Cybersitter Cyber Snoop Net Nanny 3.1 Rated-PG SurfWatch X-Stop 2.0

List price	\$29.95	\$39.95	\$29.95	\$39.95	\$54.95	\$19.95	\$29.95
Supports rating standards	■	■	■	■	■	■	■
Administrator can configure for multiple users and groups	■	■	■	■	■	■	■
Administrator can activate and deactivate monitoring	■	■	■	■	■	■	■
Approved/Restricted Lists							
Program provides approved/restricted lists	■	■	■	■	■	■	■
Administrator can edit lists	■	■	■	■	■	■	■
Vendor provides list updates for download	■	■	■	■	■	■	■
Administrator can import lists	■	■	■	■	■	■	■
Monitoring							
Logs online time/hits	■	■	■	■	■	■	■
Can filter by specific words	■	■	■	■	■	■	■
Monitors/restricts Windows application usage	■	■	■	■	■	■	■
Prevents distribution of personal information	■	■	■	■	■	■	■
Tampering Protection							
Password tampering deterrent	■	■	■	■	■	■	■
Restricts/logs file tampering	■	■	■	■	■	■	■

Snoop is for you.—JM

Cyber Snoop 2.0. List price: \$29.95. Pearl Software Inc., Chester Springs, PA; 800-732-7596; fax, 610-827-7978; www.pearlsw.com. *Circle 477 on reader service card.*

Net Nanny Ltd.

Net Nanny

For complete control over what information can be sent or received on your PC, the flexible and easy-to-use Net Nanny 3.1. (\$39.95 list) may be your answer. You can use its free downloadable lists (updated every two weeks) or your own custom ones to mask objectionable words, block sites, or even shut down a program, while logging all activity that occurs. NetNanny is not as robust in its filtering capabilities as Cybersitter or in its charting as Cyber Patrol, but it is still an effective filtering tool.

To get started, you can use Net Nanny's downloadable Can go list of URLs or its Can't go list of URLs, newsgroups, and chat channels to reflect your own values. You also can create your own lists to include objectionable words

and phrases as well as any personal information you don't want your child to share with others, such as names, addresses, phone numbers, and credit card numbers. You will need to enter all permutations of a number (555-1234, 5551234, and 555 1234), to catch all possibilities, however.

When Net Nanny detects a listed vio-



Net Nanny uses a simple yet effective blocking technique.

lation, it can block access, monitor hits, mask words, or shut down an application—all of which worked well in our tests. The password-protected administration program controls these penalties, and they can be reviewed and modified at any time. Administration is easy to access and use, even while using other applications.

Net Nanny's successful monitoring and personalized custom options, along with its informative manual and easy configuration tools, make it well suited to families having children of all ages.—KM

Net Nanny 3.1. List price: \$39.95. Net Nanny Ltd., Vancouver, B.C., Canada;

800-340-7177, 604-662-8522; fax, 604-662-8525; www.netnanny.com. *Circle 478 on reader service card.*

PC DataPower

Rated-PG

Featuring sophisticated time management for applications, Rated-PG (\$54.95 list), from PC DataPower, lets you control your children's computer time. The product also includes more than 2,500 Internet addresses that have been rated according to the SafeSurf Internet Rating Standard.

While the installation process is virtually hands-off, configuring this system is not. The time-consuming process begins by requiring you to log on by using the Microsoft Windows 95 Logon Screen and the user name Admin, in order to change settings. To switch users or test your settings, you must shut down and log on as a different user. Under Admin, all restrictions are turned off.

All applications used, including your Internet dial-up and browser, must be listed in the Application Control List. Applications may be set for daily, weekly, or

SUITABILITY TO TASK

Net Nanny

	Power	Ease
Standard configuration	Excellent	Excellent
Customization	Good	Good
Local monitoring	Fair	Excellent

SUITABILITY TO TASK

Rated-PG

	Power	Ease
Standard configuration	Fair	Fair
Customization	Good	Good
Local monitoring	Excellent	Good

POLITICAL



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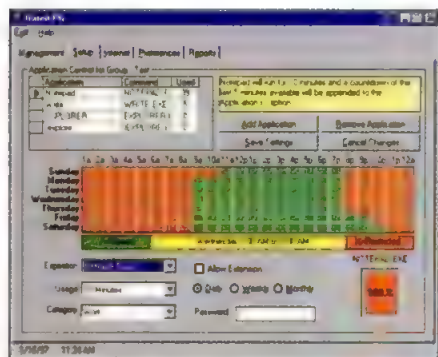
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Internet Filtering Utilities



Rated-PG allows administrators to set detailed usage schedules for applications on an individual basis.

monthly time usage for each user, and you can set a warning or simply shut down when the time expires. You also may allow for a time extension; all applications and files can be password-protected for each user. New installations can be restricted by using the Never run option in the preferences window.

This product provides usage reports that can be filtered by users, user groups, application groups, or all of them. You can use the reports to generate pie charts or bar graphs of how each user's time is spent.

Rated-PG's site and word list can be updated by subscription. Registered users get two free upgrades. Although difficult to set up and run, Rated-PG works well and is easy to manage once configured.—*KM*

Rated-PG. List price: \$54.95. PC Data-Power, Irvine, CA; 714-553-8883; fax, 714-853-8136; www.ratedpg.com. *Circle 479 on reader service card.*

SpyGlass Inc.

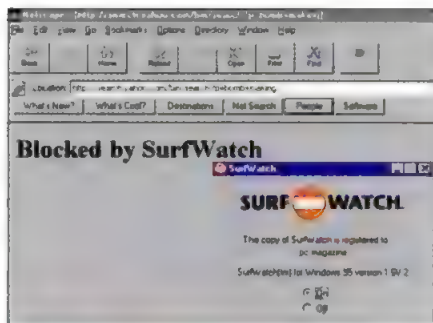
SurfWatch

A pioneer in the industry, SpyGlass's SurfWatch 1.6 (\$19.95 direct) remains an effective filtering tool but doesn't let you edit restrictive lists or change your password. Its ease of use, simple setup, and robust filtering library still make it a worthwhile choice.

SurfWatch places a priority on re-

stricting sexually explicit Web sites. It also lists, identifies, and blocks sites containing violence, hate speech, illicit drugs, alcohol, and gambling. When a user tries to access a restricted site with Netscape Navigator, Internet Explorer, or Mosaic, SurfWatch returns a Blocked message. SurfWatch also blocks FTP and Gopher sites, newsgroups, and IRC chat channels.

At press time, this product didn't allow access to its word-and-site database. But Version 2.0—which is due out by the time you read this—will allow users to create their own Custom, Restrict, and Allow lists and will also include the Yahoo!igans Allow list.



Parents can choose to block sites with the message Blocked by Surf Watch, as either a screen or a dialog box.

SurfWatch becomes operational immediately upon installation. You can subscribe to its monthly maintenance plan. Despite some limitations, this is still a good choice for families who want a program that essentially runs itself.—*KM*

SurfWatch 1.6. Direct price: \$19.95. SpyGlass Inc., Los Altos, CA; 415-948-9500; 888-677-9452; fax, 415-948-9577; www.surfwatch.com. *Circle 480 on reader service card.*

Logon Data Corp.

X-Stop

A robust word- and URL-filtering tool, X-Stop 2.0 (\$29.95), from Logon Data Corp., is straightforward and simple to use. It screens obscenities and racial and ethnic slurs, and it blocks illicit Web sites and searches. It also was the only product in this roundup to offer a means of restoring your system after a disable attempt. The system uses dual password protection, and the user may customize although not view the included lists.



X-Stop prevents viewing objectionable sites with a full-screen message locking out the user.

Since X-Stop warns that tampering can leave your PC functioning erratically, a comforting feature is the Rescue Disk. Created during the install process, the Rescue Disk allows you to rebuild if someone tries to hack your system.

X-Stop has five filtering libraries: foul word, e-mail, URL, search engine, and search engine keyword. You can receive free daily updates from X-Stop's Web site.

The user customizes the actual lists without access. By your entering words, URL addresses, or search engines onto the library-edit screen, the Remove button will be enabled. If the word or address doesn't exist, the Add button is enabled.

X-Stop will filter words from its foul word library on and off the Internet. Though X-Stop doesn't currently monitor the Winsock, Logon plans to add Winsock 2.0 support in a future version of the product. We tested word processing applications, e-mail, even Visual Basic, and X-Stop x'd out the words as quickly as they were typed.

In short, X-Stop takes the job of blocking obscenity seriously. For users looking to filter what their children see without a lot of bells and whistles, X-Stop offers a solution.—*KM* □

X-Stop 2.0. List price: \$29.95. Logon Data Corp., Anaheim, CA; 888-786-7999, 714-577-4929; fax, 714-577-4932; www.xstop.com. *Circle 481 on reader service card.*

SUITABILITY TO TASK

SurfWatch

	Power	Ease
Standard configuration	Excellent	Excellent
Customization	Poor	Poor
Local monitoring	N/A	N/A

SUITABILITY TO TASK

X-Stop

	Power	Ease
Standard configuration	Excellent	Excellent
Customization	Fair	Fair
Local monitoring	Good	Fair

OFFICE



Gossip



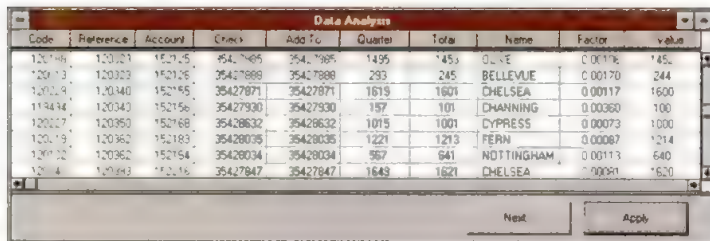
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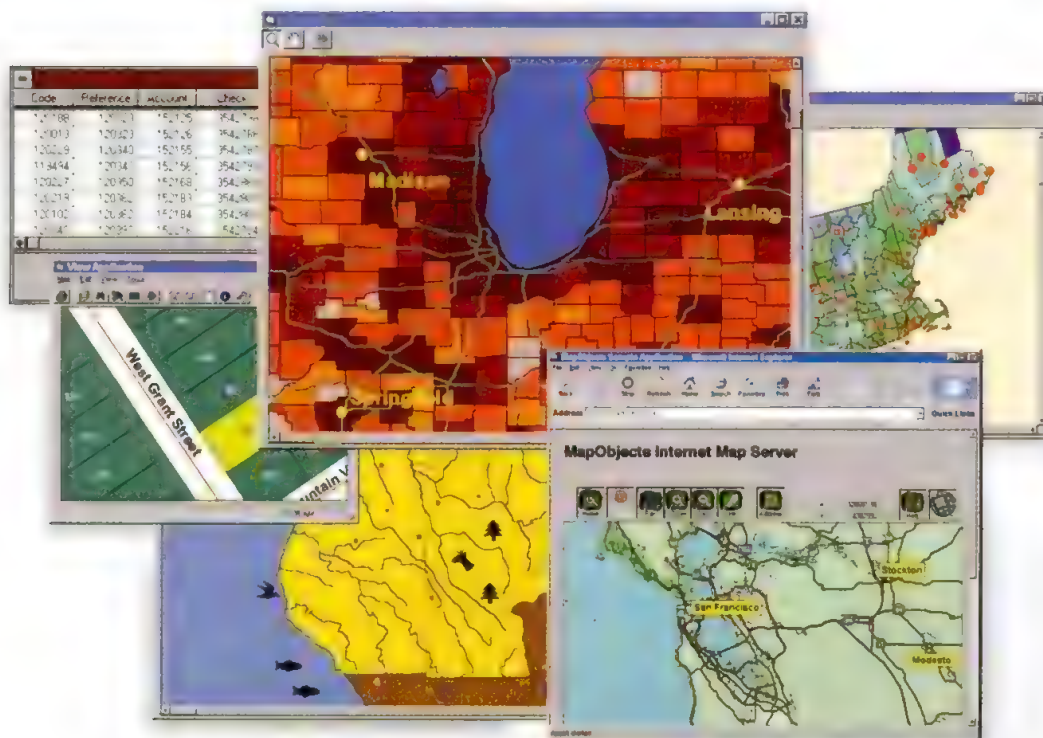
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This Is Your App...



Code	Reference	Account	Check	Add To	Quarter	Total	Name	Factor	Value
120106	120101	152125	35427895	35427895	1495	1453	OLIVE	0.00176	1453
120113	120102	152126	35427899	35427899	293	245	BELLEVUE	0.00170	244
120114	120140	152145	35427871	35427871	1619	1601	CHELSEA	0.00117	1600
113434	120343	152156	35427930	35427930	157	101	CHANNING	0.00360	100
120217	120350	152168	35428632	35428632	1015	1001	CYPRESS	0.00073	1000
120119	120362	152183	35428035	35428035	1221	1213	FERN	0.00087	1214
120132	120362	152154	35428034	35428034	567	641	NOTTINGHAM	0.00113	640
120114	120363	152116	35427847	35427847	1643	1621	CHELSEA	0.00091	1620

This Is Your App with MapObjects...



With MapObjects, users can

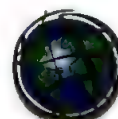
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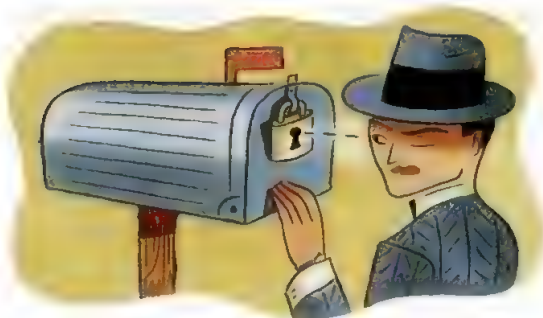


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internet

E-MAIL encryption

Is your e-mail safe? Protect your Internet correspondence from snooping, tampering, and forgery with one of the six e-mail encryption products that we review. *By Sheryl Canter*

Unlike e-mail on a private system, which goes straight to the server and sits there until retrieved, Internet e-mail bounces from server to server on its way to the recipient. This makes the transmission channel impossible to secure and provides numerous opportunities for interference. In this story, we review six products that provide Internet e-mail security. You'll find previews of two more in the sidebar "Upcoming S/MIME E-Mail Enables a Secure Future." All the products in this roundup offer protection against three types of interference—snooping, tampering, and forgery.

SECRET CODES

E-mail security relies on encryption. Conventional encryption, called *symmetric encryption*, uses the same key for encoding and decoding. This method is computationally fast but has a glaring weakness: How do you securely distribute the key? Phone lines and unencrypted e-mail may not be secure. You could meet your correspondent in the park and hand off the key on a slip of paper, but this is often inconvenient.

Asymmetric encryption eliminates the problem by using two keys, one public and one private. The sender uses the recipient's public key to encode the message, and the recipient uses his or her private key to de-

code it. The two keys are mathematically related, but it is virtually impossible to derive the private key from the public key. E-mail security programs keep a private key private by requiring you to enter a password before using it.

The asymmetric method eliminates one problem but introduces two new ones. First, you need to find a person's public key to encrypt the message, and second, encryption and decryption by this method are very slow. The first problem is being addressed with a new Internet directory service called Lightweight Directory Access Protocol (LDAP), which is discussed below. To get around the second problem, most programs use symmetric encryption to encrypt the message content, and then encrypt the key using asymmetric encryption. This hybrid approach, sometimes called a *digital envelope*, offers the speed of symmetric encryption with the security of asymmetric encryption.

DIGITAL SIGNATURES

Encryption can be used to check for tampering and forgery through a technique called *digital signatures*, or encryption using the sender's private key.

To alert the recipient in case of tampering, the security program generates a mathematical "summary" of the message, called a *hash*, encrypts the hash with the



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SUMMARY OF FEATURES

E-Mail Encryption Utilities

■ YES ■ NO

Products listed in alphabetical order

	E-Mail Connection 3.1	ExpressMail 1.08	PGPmail 4.5 beta 8	POTP Secure Mail 1.62	SecretAgent 3.14/3.23	Secure Messenger 1.0
List price	\$49.95	\$45.00	\$149.95	\$89.00	\$179.95	\$49.00
Standalone e-mail client	■	■	■	■	■	■
Plug-in for Eudora/Exchange/Netscape Mail	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■
Supports MAPI/VIM	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■
Supports S/MIME	■	■	■	■	■	■
Supports LDAP for obtaining public keys	■	■	■	N/A*	■	■
Encrypts Internet e-mail text/rich content/attachments	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■	■ ■ ■
Can encrypt files on-disk/text on Clipboard	■ ■	■ ■	■ ■	■ ■	■ ■	■ ■
Can compress before encrypting	■	■	■	■	■	■
Supports digital signatures/detached digital signatures	■ ■	■ ■	■ ■	N/A**	■ ■	■ ■
Supports hardware tokens	■	■	■	N/A*	■	■
Users can create individual trust hierarchies	■	■	■	N/A*	■	■
Supports long filenames	■	■	■	■	■	■
Secure file deletion after encryption	■	■	■	■	■	■
Command line interface	■	■	■	■	■	■

N/A*—Not applicable: This product uses one-time pad encryption rather than public-key encryption.

N/A**—Not applicable: This product uses an alternative method to protect against intruders.

sender's private key, and transmits the sender's public key along with the message. On the other end, the recipient's security program uses the sender's public key to decrypt the hash. If the hash is still a true summary of the message, then the message has arrived intact.

But how do you know that when you receive a message from, say, Bill Clinton, the sender really is Bill Clinton and not just someone posing as him? Digital signatures can help here, too. The security program encrypts the public key of the sender with the private key of a third party and sends this "signature" along with the message.

In case you don't know or trust the third party, the third party's public key can be "signed" by a higher authority whom you do know and trust. These digital signatures, which are transmitted along with the encrypted message, are called the *trust hierarchy*.

Certificate authorities, such as VeriSign, issue and manage public keys, thus serving as the ultimate authority in the trust hierarchy. Deming's Secure Messenger provides a wizard for registering a public key with VeriSign. ExpressMail, from OpenSoft, lets you establish your own, self-signed trust hierarchy.

You need people's public keys to send encrypted messages and verify signatures, but where do you get them? A variety of companies are using the new Internet directory protocol, LDAP, to

set up databases with public keys. So a desirable feature of Internet e-mail security programs is LDAP support for accessing these databases. Netscape's upcoming Communicator will include LDAP support.

THE S/MIME STANDARD

Until recently, to decrypt a message the recipient had to be running the same software as the sender. The new S/MIME standard for Internet e-mail security changes all this, because S/MIME programs are interoperable. A message encrypted by one S/MIME-compliant program can be decrypted by any other. Three of the six programs reviewed here (E-Mail Connection, ExpressMail, and Secure Messenger) support S/MIME. Netscape Communicator and e-Lock, from Frontier Technologies, will also support S/MIME (see the sidebar "Upcoming S/MIME E-Mail Enables a Secure Future" for more details).

S/MIME adds security to the MIME standard for rich e-mail content and allows for a variety of encryption methods with varying degrees of security. Why not just use the most secure method available? Federal law classifies strong encryption algorithms as "armaments" and restricts their export. Programs using long keys that exceed government limits can be distributed only in the U.S. and Canada. All of the programs we review here—except SecureMail, pro-

duced by an Israeli company—come in two versions, domestic and export. We reviewed the domestic versions.

PLUG-INS

Several of the products reviewed here include plug-ins for Microsoft Windows Messaging (the Windows 95 Inbox) or Eudora Pro 3.0. Eudora plug-ins are made possible by a new EMS (Extended Messaging Services) API. Also new with Eudora Pro 3.0 is MAPI support—a feature on which the PGPmail plug-in relies. Be warned, however, that Windows Messaging will not operate when Eudora's MAPI services are enabled. When you turn off this option, your Inbox will be restored.

The security features in Microsoft Exchange 5.0, which was in late beta at press time, are not S/MIME-compliant, but Microsoft has promised an S/MIME compliant release sometime in 1997. This will not negate the usefulness of client-side Exchange plug-ins, however, since the encryption functionality will reside on the Exchange Server and not on the client. You'll have to run Exchange in a networked environment to use the security features.

Internet e-mail programs that support S/MIME and LDAP are just starting to appear in the marketplace. When they become widespread, Internet e-mail security will be the norm rather than the exception.

ConnectSoft Inc.

E-Mail Connection

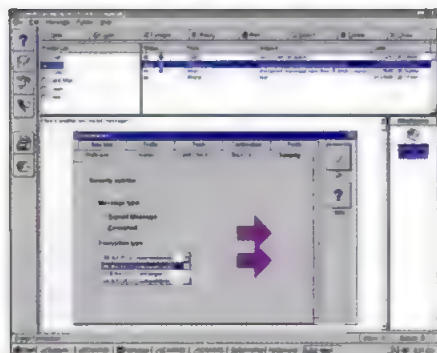
Supporting both Internet e-mail and most other major e-mail clients, E-Mail Connection 3.1, from ConnectSoft (\$49.95 list), provides a basic, no-frills implementation of S/MIME that lets you send secure mail to virtually anyone, anywhere. E-Mail Connection supports America Online, cc:Mail, CompuServe, Lotus Notes, MCI Mail, Microsoft Mail, NetWare MHS, Prodigy, and others, in addition to Internet e-mail clients.

You create a public/private key pair by clicking the Security button in the User Information dialog box. You can create only one key pair per user, however, and you must delete the current key pair to create a new one. A backup option protects against accidental deletion and lets you restore old keys if necessary.

When composing a new message, click on the Options button to set the security properties. The resulting dialog box lets you choose whether to sign the message, encrypt it, or both; it also lets you select from three encryption methods. The strongest encryption method the program supports is 128-bit RC2, which is quite a bit weaker than the methods available in most other products we reviewed.

E-Mail Connection prompts you for your password whenever you access your private key—when you encrypt a message, when you decrypt a message, and when you attempt to delete the key. The program can't enter the password for you automatically, as it can in Deming's Secure Messenger.

E-Mail Connection 3.1. List price: \$49.95. ConnectSoft Inc., Bellevue, WA; 800-889-3499; fax, 206-489-3446; www.connectsoft.com. Circle 497 on reader service card.



E-Mail Connection lets you choose from among three encryption algorithms.

Editors' Choice

• ExpressMail 1.0.8



The ability to send sensitive documents and correspondence

without fear of interception is a high priority in today's e-mail-reliant business world, and ExpressMail 1.0.8, from OpenSoft Corp., does it best. This \$45 plug-in for Microsoft Windows Messaging offers security that complies with the new S/MIME standard for interoperable Internet e-mail encryption and authentication.

OpenSoft Corp.
ExpressMail



More than just a plug-in, OpenSoft's ExpressMail 1.0.8 (\$45 list) not only adds S/MIME security features to Microsoft Windows Messaging but also replaces several components, including the Internet Transport Protocol and the address book. This lets ExpressMail support features like detached signatures that other plug-ins, such as Deming's Secure Messenger, cannot, and makes ExpressMail a strong, full-featured choice for those using Windows Messaging as their e-mail client.

The program is not without its problems, though. ExpressMail's implementation of Remote Mail differs from Microsoft's, and we encountered some problems with it during testing that required us to disable Microsoft's Remote Mail to use the product. Also, ExpressMail's dial-up networking support conflicts with the Internet applet in the Windows control panel.

ExpressMail's most unique feature is its Security Administration function, which lets you create and manage your own trust hierarchy. You'll need to read the documentation to figure out how to do this, and the feature is somewhat hidden. The company says it deliberately made the feature inaccessible to prevent accidental changes.

ExpressMail's enhanced address

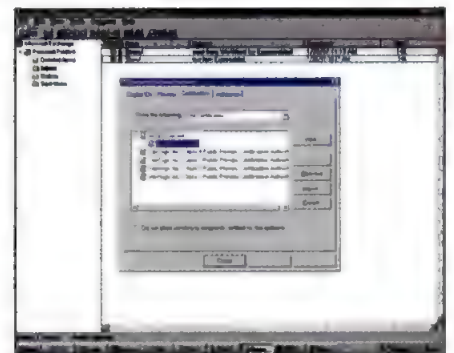
ExpressMail goes beyond simply adding security features to Windows Messaging. It lets you send secure mail to someone without an S/MIME-compliant e-mail client by distributing the Decrypter applet with the message, giving you interoperability with any Internet e-mail client.

ExpressMail is the only product reviewed that allows you to establish your own trust hierarchy. The program replaces Windows Messaging's Internet Transport Protocol and address book, allowing you to create detached signatures. In addition, ExpressMail supports MAPI, so you can compose and send encrypted messages from within any MAPI-enabled application.

This full-featured plug-in can make Windows Messaging a complete, secure e-mail solution.

book contains the public keys for the recipients and lists what type of encryption is used for each person—for example, shorter keys may be used for overseas recipients. This feature lets you send encrypted messages to multiple people at once. With the product's MAPI support, you can compose and send encrypted messages from within Microsoft Word for Windows or any other MAPI-enabled applications.

Messages are decrypted seamlessly with ExpressMail. If you're sending secure mail to a recipient without an S/MIME e-mail client, you can send along the bundled Decrypter applet. The product license, per RSA requirements, lets you distribute one copy of the Decrypter for each licensed copy of ExpressMail. **ExpressMail 1.0.8.** List price: \$45. OpenSoft Corp., Los Angeles; 800-996-6736; fax, 212-260-0592; opensoft.com. Circle 498 on reader service card.



You can create your own trust hierarchy with ExpressMail.

Upcoming S/MIME E-Mail Brings Security

By Sheryl Canter

We are just beginning to see the impact S/MIME-compliant e-mail encryption products can have in the marketplace. Two new e-mail clients that will be adding S/MIME support should be available by the time you read this.

Netscape Communicator, from Netscape Communications, and e-Lock, from Frontier Technologies, are continuing the trend toward rapid acceptance of the S/MIME standard. Netscape Communicator (www.netscape.com) is in beta as of this writing, but the S/MIME features have not yet been enabled. The list price will be \$49. And e-Lock (www.frontiertech.com) should be in public beta when you read this; its price is not yet settled.

Netscape Communicator contains the next major upgrade to Netscape

Navigator. The e-mail component, called Netscape Messenger, will offer a variety of enhancements in addition to S/MIME support. These include integrated LDAP directory services, to make it easy to find a recipient's public key, and automatic adjustment of encryption levels for overseas recipients. You will also be able to send encrypted e-mail to multiple recipients at once, with each message encrypted at the level the recipient can decode.

Other new features in Netscape Messenger include HTML-based rich formatting and support for the new Internet e-mail protocol IMAP4, the successor to POP3. IMAP4 enables many enhancements: You can store your mail on the server, organized into folders, where it's accessible from home or office. You can view

subject lines of waiting messages and can decide which ones to download—and even download just the text portion of a message when the attachment is very large.

Frontier Technologies' e-Lock offers an S/MIME-compliant, standalone Internet e-mail client with plug-ins for Microsoft Windows Messaging and Eudora Pro 3.0. A secure Web client and a secure Web server are optional. The product supports hardware tokens (such as smart cards), SmartDisks, and Smart Tokens, as well as software-based methods. The most unique feature of e-Lock promises to be its full-featured Certificate Issuing System, which lets you issue, revoke, renew, and manage public key certificates. The system will adhere to industry standards for certificate creation and management.

Pretty Good Privacy Inc.

PGPmail

Offering strong security features and accessibility, PGPmail 4.5 beta 8, from Pretty Good Privacy (\$149.95 list), is a good choice for Internet e-mail security. But since it's not S/MIME-compliant, all of your recipients must be running it, too. The product originated before S/MIME existed and so sets its own standard. This disadvantage is ameliorated somewhat by the program's close integration with Windows 95 and all the major Internet e-mail programs: Microsoft Windows Messaging, Netscape Mail, and Eudora Pro 3.0. We reviewed the public beta of version 4.5; the shipping version should be available by the time you read this.

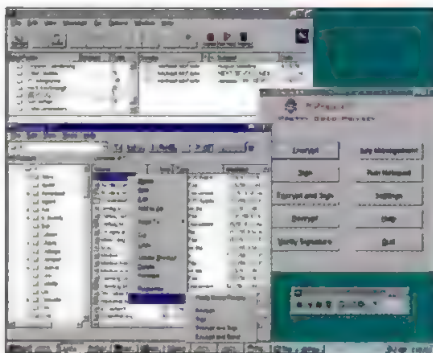
PGPmail works with Netscape Mail and Eudora as a plug-in, adding icons to their toolbars, and communicates with Windows Messaging via MAPI. Support for MAPI and Eudora are new with this version.

Also new is integration with the Windows 95 Explorer. Right-click on any file and you'll see PGP on the context menu; then you can encrypt, sign, and send a file. The MAPI-based Send option will put the encrypted file in your Windows Messaging out-box as an attachment. The Netscape

and Eudora plug-ins let you encrypt message text from within the e-mail program, but not attachments.

A small, floating toolbar called The Encyptor lets you encrypt, sign, decrypt, and verify text in the Clipboard—a unique convenience. Write your message in any word processor, cut it to the Clipboard, encrypt it with a single button click, and paste it back in. PGPmail may be a proprietary solution, but it is a good one.

PGPmail 4.5 beta 8. List price: \$149.95. Pretty Good Privacy Inc., San Mateo, CA; 888-747-3011, 602-944-0773; fax, 602-943-2601; www.pgp.com. Circle 499 on reader service card.



PGPmail includes the Encyptor, which lets you work with Clipboard text.

Elementrix Technologies Inc.

POTP SecureMail

Offering an encryption scheme so unbreakable that it would violate U.S. export laws were it a domestic company, POTP SecureMail 1.02.04 (\$89 list), from Elementrix Technologies, an Israeli company, is a full-featured and user-friendly Internet e-mail client. SecureMail offers quick, strong encryption and ease of use, but it isn't a good choice if you need interoperability with other e-mail clients, because it's not S/MIME compliant.

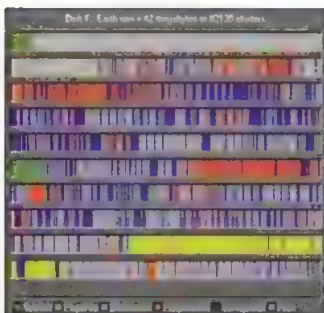
SecureMail is the only product in this roundup that doesn't use hybrid public key encryption. Instead, it uses a method termed *dynamic key encryption*. Keys are generated on the fly as the message is sent and are never transmitted, even in encrypted form. Since keys are used only once, there is no need for key management or certificate authorities.

The channel between the sender and the recipient is secured once during an initial handshake that generates a starting key and establishes the identity of each correspondent. The handshake procedure is initiated from within the address book; it is inconvenient but not difficult. You must purchase a copy of SecureMail for

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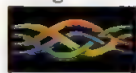
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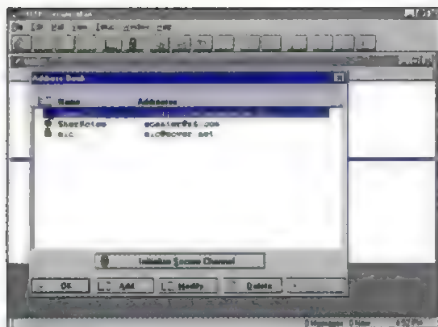
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THE 1997 UTILITY GUIDE

E-Mail Encryption Utilities



A closed lock indicates a secure channel with POTS SecureMail.

every machine you use, because the initial security handshake relies on the product's serial number.

You must establish a secure channel with a recipient before you can send secure mail to that person. When a secure message is transmitted, the key is changed dynamically for each packet sent using a state change algorithm. The keys are the same length as the transmitted data and are encrypted together. The result is a virtually unbreakable encryption scheme that protects against forgery.

POTS SecureMail 1.02.04. List price: One package, \$89; two packages, \$142. Elementrix Technologies Inc., New York; 800-711-6606, 212-888-8879; fax, 212-265-9684; www.elementrix.co.il. *Circle 500 on reader service card.*

AT&T Business Communications Services

SecretAgent

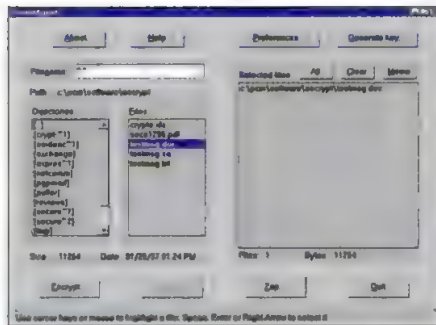
Written by Information Security Corp. and distributed by AT&T, SecretAgent 3.14/3.23 is an e-mail security system offering support for MAPI 1.0, VIM 2.0, and EasyLink, the mail-handling system used by AT&T Access PLUS. Though not designed for Internet e-mail, it can communicate with the Windows Messaging program through MAPI. SecretAgent is a full-featured e-mail security program, but its lack of support for S/MIME hampers its utility for Internet e-mail security.

SecretAgent uses hybrid public key technology for encryption and signatures. You manage public keys with a separate utility. SecretAgent's public keys have two components: the user ID and the address. To use SecretAgent with Windows Messaging, you must leave the address portion of the public key blank, set up an

alias in your address book that matches the user ID portion of the public key, and check the box for "Mail via: MAPI" in the Preferences dialog box. Then when you encrypt a file, it will automatically be sent to your out-box as an attachment.

If you are using Microsoft Mail, cc:Mail, or AT&T Access Plus, you can use an optional plug-in to access encryption features from within your e-mail program. The company is working on a plug-in for Windows Messaging.

SecretAgent supports numerous encryption schemes, including hardware-based solutions, such as the Fortezza Crypto Card. It also offers both DSA and RSA digital signatures and two types of compression. Its file-erase feature, called Zap, meets federal standards for complete removal of a file from your hard disk.



SecretAgent's uncluttered interface lets you select groups of files for batch encryption.

SecretAgent 3.14/3.23. List price: \$179.95. AT&T Business Communication Services, Greensboro, NC; 800-203-5563; fax, 847-405-0356; www.att.com/bcs/secure_software. *Circle 501 on reader service card.*

Deming Internet Security

Secure Messenger

One of the first S/MIME-compliant e-mail security programs, Secure Messenger 1.0 (\$49 list), from Deming Internet Security, includes plug-ins for Microsoft e-mail clients (Windows Messaging, Microsoft Exchange Client, and Microsoft Outlook) and Eudora Pro 3.0, as well as a standalone encryption interface. It's a powerful tool for these programs, but you'll have to spend some time learning how to harness that power.

The address book is organized by person rather than by key, allowing more than one key per person. This is useful,

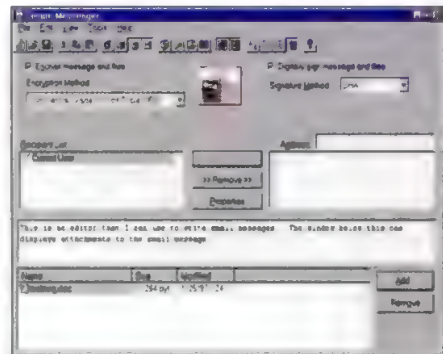
because keys can expire or be withdrawn. Secure Messenger will automatically determine which key is valid. On the downside, this additional layer makes the product a little harder to understand and use. Also, the documentation can be sketchy. For example, you can create additional S/MIME User Databases, but the documentation never explains why you'd want to do this. (The feature is meant for machines with multiple users.)

The main interface lets you manage your keys and create encrypted files that consist of a text message, attachments, or both. Inconveniently, the Add dialog box lets you select only one attachment file at a time. When you're done, you can either save the encrypted file to disk or send it through MAPI. If you choose to send the file, it will appear in your out-box as an attachment. Double-click on the attachment to decrypt it. A dialog box will display the text message and let you extract the attachments.

If you use the Windows Messaging or Eudora plug-ins, encryption and decryption are so seamless you may not realize they're happening without checking the message properties. If you select "Prompt each time a private key is accessed" in the Security Settings, then you will know in advance when incoming messages are encrypted.

Secure Messenger offers powerful security options but requires some extra work to access it all. □

Secure Messenger 1.0. List price: \$49. Deming Internet Security, a Worldtalk Company, Santa Clara, CA; 800-454-4674, 408-567-5168; fax, 408-567-1543; www.deming.com. *Circle 502 on reader service card.*



The Secure Messenger interface lets you manage your key database and create encrypted files.

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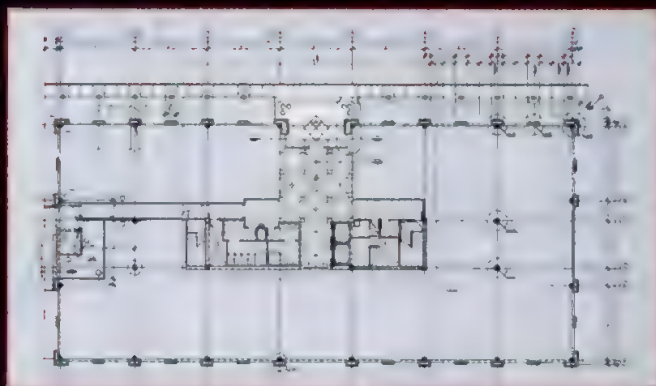
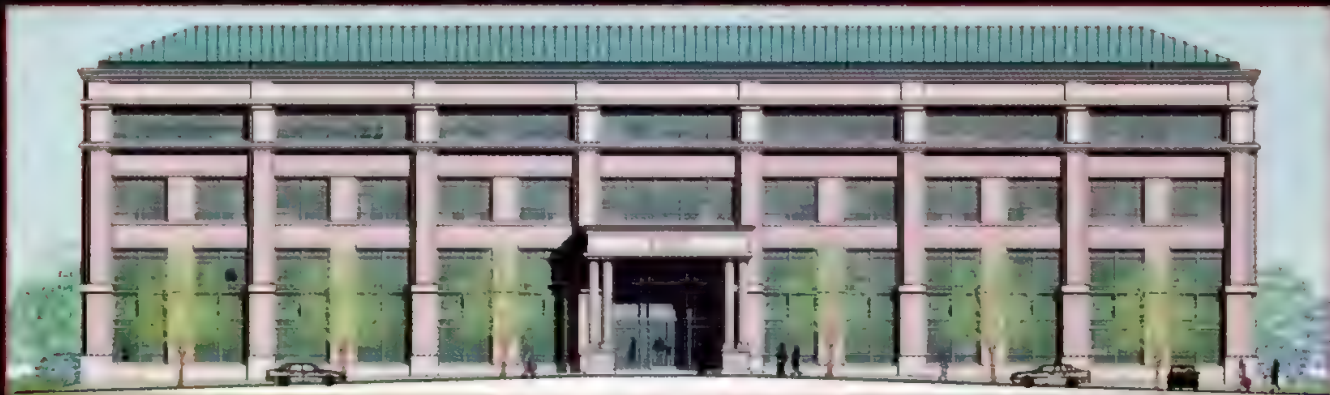


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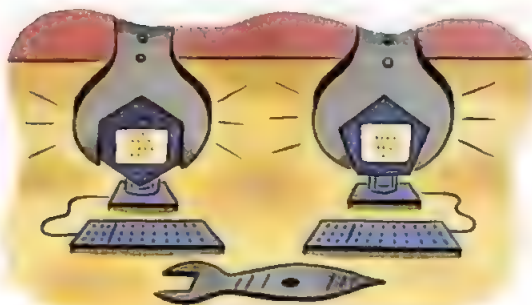
MiniCad has a suggested retail price of \$795, and it comes with 18 months of free tech support and a 30-day money-back guarantee from participating dealers. MiniCad 6 supports Windows 95, NT, 3.1, and Macintosh OS.

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OS/2, NT, & WIN 3.x utilities

Not everyone in the world uses Windows 95. We showcase some of the best utilities around to help users of OS/2, Windows NT, Windows 3.x, and DOS get the most out of their systems.

OS/2 utilities

The OS/2 utilities market is alive and well, as our sample shows. Here are some of the best. BY BRIAN PROFFIT

ANTIVIRUS

Dr. Solomon's Anti-Virus Toolkit (\$89) is an excellent antivirus program that offers frequent virus signature updates. The package, from Dr. Solomon's Software (888-377-6566; www.drsolomon.com), includes a complete DOS version of the toolkit. The OS/2 program, which can be run as background task, isn't fooled by DOS stealth viruses, and it checks for macro, boot sector, and partition definition sector viruses as well.

IBM AntiVirus (\$49; IBM Corp., 800-426-2255; www.ibm.com), is an extremely thorough antivirus program, with perhaps the most detailed virus information help file available. The user interface isn't the greatest, but since you rarely interact with antivirus programs, that isn't really a problem. IBM AntiVirus excels not only at detecting and correcting a wide array of viruses but also at detecting and avoiding false-positive readings. Regular updates provide new virus signatures for scanning.

McAfee VirusScan (\$129; McAfee Associates Inc., 408-988-3832; www.mcafee.com) is an excellent scanning tool and includes protection from stealth and macro viruses. The

product is able to correct many infections automatically. As with all entries in this category, McAfee includes real-time protection for DOS sessions.

BACKUP

Back Again/2 Professional (\$149; Computer Data Strategies Inc., 800-284-4156; www.cds-inc.com) combines a superior user interface with a long list of supported drives and flexible automated backup scheduling. The many supported SCSI tape drives are supplemented by some (not many) EIDE drives and cartridge drives, including Bernoulli, Iomega, and Syquest. Back Again/2 Professional allows backup to floppy disk and features intelligent compression algorithms and disaster recovery features.

Intended primarily for use with floppy disks and parallel port-based tape drives, **BackMaster** (\$89; MSR Development Corp., 619-633-3900; www.msrdev.com) has now added support for SCSI devices, but it is still sketchy on removable cartridge drives and doesn't back up to network drives. It is relatively easy to use, with good disaster recovery.

BakUpWiz (OS/2 only, \$149; OS/2 and DOS, \$225; PCX Inc., 800-800-4729) supports a broad range of

SCSI and parallel port tape devices, plus removable cartridge, floppy disk, and magneto-optical drives. The user interface isn't great, and configuration options



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OS/2, NT, and Win 3.x Utilities

are limited, but the speed and reliability are excellent. Disaster recovery is more labor-intensive than with other packages.

DualStor (\$55; IBM Direct, 800-426-2255; ibm-direct.e-com.ibm.com), is moderately easy to use and configure, but it focuses on floppy and parallel port tape drives rather than on SCSI or removable cartridge media.

NovaBack (\$199; NovaStor Corp., 805-579-6700), supports SCSI (including autoloading drives), QIC 40/80, and 3010/20 tape drives. The product, which offers automated scheduling and data compression, is reasonably easy to configure.

Superior usability and configurability make **Seagate Backup** (\$99; Seagate Software Inc., 800-327-2232; www.sssmg.seagate.com), an excellent choice for use with floppy disks or parallel port-based tape drives. The product uses Stacker compression algorithms.

Seagate's server backup offering, **Sytos Premium** (\$299), is designed to work with IBM NetView. It focuses on SCSI backup devices and automated multiple-cartridge systems.

DATA COMPRESSION

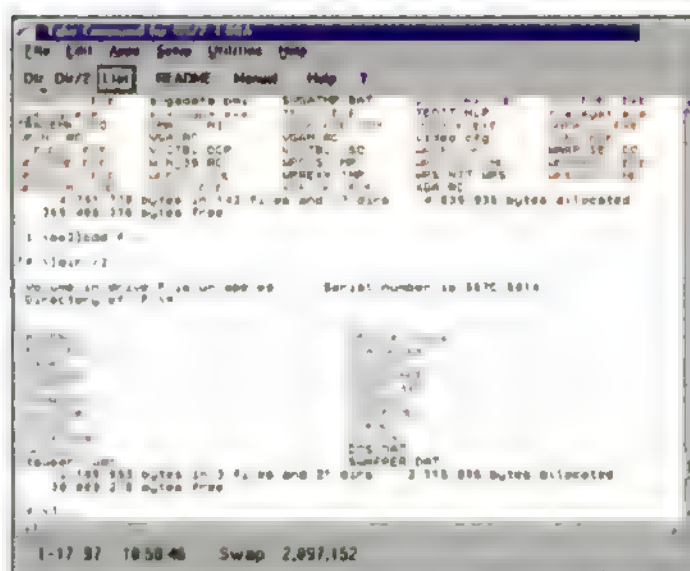
Stacker (\$199; Stac Inc., 619-794-4354) allows compressed drives to be shared by OS/2, Windows, and DOS. The package includes a defragmentation tool that works on compressed partitions. You can convert DoubleSpace, DriveSpace, and SuperStor/DS drives to Stacker format and migrate to Warp without uncompressing your drives.

ZipStream, an extremely reliable compression package (\$99.95; Carbon Based Software; www.carbonbased.com.au), uses OS/2's Installable File System facility to access disk drives. Not as fast as Stacker, ZipStream is easier to install, use, and—more important—recover from, should problems occur.

DATA TRANSFER

LinkRight (software only, \$119; with LapLink-compatible cables, \$189; Rightware, 301-762-1151) is a multithreaded serial and parallel port file-transfer utility. The package includes Presentation Manager and DOS versions. LinkRight Cloner copies a complete OS/2 partition, including boot information.

LinkWiz (with cables, \$189; PCX Inc., 800-800-4729) transfers files between com-



Take Command's graphical interface offers quick access to OS/2 commands.

puters using special cables attached to the parallel or serial ports. With the parallel port you can achieve speeds up to 5MB per minute. LinkWiz allows data transfer among OS/2, DOS/Windows, and Unix systems, and you can clone complete OS/2 systems onto other computers.

DESKTOP MANAGEMENT

DeskMan/2 (\$79.95; Development Technologies Inc., 803-790-9230) is an excellent collection of tools. The MultiDesk Personal Desktop Facility allows you to configure individualized desktops, which, like other system configuration information, can be saved and restored. The Access Control Policy Facility provides security, including control over individual objects and access logging. The Workspace Facility lets you to establish multiple virtual desktops that you can switch among. Other workplace shell extensions provide low-level control over object attributes, such as menus and object IDs.

Desktop Observatory (\$179; Pinnacle Technology Inc., 800-525-1650; www.pinnacletech.com) lets you back up and restore desktop layout, establish standardized desktops by organization, and establish desktops for each user, no matter what system on the network the user logs on to. Desktop Observatory provides an audit log of access and incorrect password attempts. An included encryption program offers additional security.

Object Desktop Professional (\$179; Stardock Systems Inc., 313-453-0328; www.stardock.com) supports multiple virtual desktops for better window organization and includes a replacement for the Drives object, Object Navigator, which displays the tree and details views in separate panes.

The Control Center's tab-based program access method is easier than moving through WarpCenter's configurable trays. Object Desktop Professional allows direct access to files in .ZIP, .LZH, and .ARC archives and easy hot-key assignments.

SkyScraper (\$49; Binar Graphics Inc., 415-491-1565), provides multiple virtual desktops and easy navigation among them, as well as easy point-and-click switching between desktops and applications. You can run all of your applications maximized without losing easy switching among them.

The Secure Workplace (\$79.95; professional version, \$120; Syntegration, 800-464-9450; www.primenet.com/~syntegrn) provides access control over desktop objects, directories, and files at group and individual user levels. You can specify separate desktops for each user. The professional version offers C2-level security using OS/2's Security Enabling Services, with event auditing and a log browser, a multiple-desktop manager, and disabling of Ctrl-Alt-Del rebooting.

• **Traveling Workplace** (\$69.96; also from Syntegration) gets its name from its ability to save the OS/2 Workplace Shell desktop and restore it onto other systems. The product also allows you to configure multiple desktop layouts and easily switch among them.

DISK MANAGEMENT

A real bargain, **File Manager/2** (individual version, \$40; commercial, \$80; Barebones Software, 318-222-3455; mkimes@linux.secret.com) offers a collection of utilities that includes an archive manager (for .ARC, .ARJ, .LZH, .ZIP, and .ZOO files), an extended attribute viewer, a global file viewer, an .INI viewer/editor/backup tool, an online book and help browser, a process killer, an enhanced file finder, a program that lets you replace default system pointers, a detailed system information utility, a front end to OS/2's undelete program, and a graphically enhanced version of the Drives object.

GammaTech Utilities (\$149; SoftTouch Systems Inc., 800-944-3028; www.softouch.com) is a set of priceless disk management tools. It includes a program that can recover from catastrophic errors on HPFS volumes, often completely recovering files into new partitions; it can even back up and restore partition boot sectors. The package

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also gives you the ability to defragment HPFS and FAT partitions and undelete files from either system. You can edit disk data at the physical or logical sector level in ASCII or hexadecimal. Additional system tools let you back up and restore desktop and .INI files and wipe deleted files for greater security.

Graham Utilities (\$99.95; Development Technologies Inc., 803-790-9230) is a collection of disk and system utilities that allow data recovery and file undelete. You can often restore even corrupted partitions. The Graham Utilities are designed to work on remote drives as well, across Warp Server, LAN Server, LAN Manager, LANtastic, and NetWare.

INTERFACE

4OS2 (\$89; JP Software, 800-368-8777), a replacement for OS/2's CMD.EXE command shell, adds numerous new functions and enhancements to existing commands. You can assign aliases to frequently used commands for easier typing and beef up your .CMD files with additional functions.

FileStar/2 (\$99; SoftTouch Systems Inc., 800-944-3028; www.softtouch.com) handles basic file management jobs graphically. You can compare directories and work with files in .ZIP archives. FileStar/2's tool bar allows selection from more applications than WarpCenter will display in one tray, and the traveling briefcase lets you synchronize files between computers.

OS/2 Essentials (\$39.95; Stardock Systems Inc., 313-453-0328; www.stardock.com) includes a number of useful utilities. The helpful DirMaster Pro offers side-by-side views of directories, making operations such as moving and copying files a matter of a simple click, and many other functions are available via a button panel. FileGraph/PM tells you which directories are using the most disk space—invaluable for tracking wasted megabytes. The Trashcan provides a better interface than OS/2's for recoverable file deletions.

Take Command (\$79; JP Software, 800-368-8777) offers the benefits of JP Software's 4OS2 product in a graphical version. The new interface provides even more advantages, such as a button bar for your favorite commands and a scroll bar that allows you to look back over your command session. The program records a history of



Performance Plus provides an excellent set of tools for optimizing your system.

your commands, so repeated execution can be as simple as popping up a list box and selecting the desired command. Filename completion also shortens the number of keystrokes you have to type.

INTERNET

GammaTech IRC 2 (\$49; SoftTouch Systems Inc., 800-944-3028; www.softtouch.com) provides real-time multiuser, multichannel chatting on the Internet. A scroll-back buffer allows review of messages, and you can log conversations to disk, send and play back sound files, and write REXX scripts for programmed control.

PostRoad Mailer Pro (\$79; Innoval Systems, 914-835-3838; www.innoval.com) integrates with Netscape Navigator for OS/2. It includes support for FTP and Usenet newsgroup postings as well as e-mail. The product supports MIME/UUE attachments, and you can preview mail on POP3 servers. Multiple accounts, multiple address books, and PGP are also supported. PostRoad Mailer Pro also works with FaxWorks Pro and PMFax. A separate version, the PROFS edition, provides offline and online mail processing for users of IBM's OV/VM mainframe e-mail system.

SYSTEM

CPU Monitor Plus (\$129.95; Bon Ami Software Corp., 508-371-1997) goes beyond normal CPU activity, memory usage, and disk space availability to include interrupts and serial port activity, allowing easier diagnosis of system bottlenecks through detailed system analysis on dozens of levels. You can adjust individual task priorities and manually stop or suspend running programs.

GammaTech Power Pack (\$69.95; Sof-

Touch Systems Inc., 800-944-3028; www.softtouch.com) is a collection of handy utilities, including an Extended Attribute Editor, .INI Editor, hot-key macro program, and screen saver.

Performance Plus (\$39.95; Clear & Simple Inc., 860-658-1204; www.clear-simple.com) provides an excellent set of benchmark testing and optimization tools. The manual includes a thorough guide to the factors that affect system performance. The Optimizer provides a set of recommended changes to CONFIG.SYS and can apply them automatically. A performance boost over OS/2's default settings is almost guaranteed. You even get help tuning DOS and Win-OS/2 settings.

System Performance Monitor/2 (\$495; IBM Corp., 800-426-2255; www.ibm.com) is a resource analysis tool that analyzes CPU and memory usage and disk activity. It can report on your local machine or on other systems on your network. Colorful graphs draw the eye quickly to problem areas, such as excessive paging. The product includes Theseus2, a lower-level analysis tool that tracks memory usage by process. Repeated comparative snapshots can indicate programs that are grabbing memory indiscriminately.

The ultimate collection of OS/2 system utilities, **UniMaint** (\$99; SoftTouch Systems Inc., 800-944-3028; www.softtouch.com) may seem overwhelming to the casual user (although new function wizards simplify usage greatly), but its tools provide unsurpassed power for the more advanced user seeking control over lower-level aspects of the system. UniMate includes desktop backup and restore, .INI file repair and editing, and extended attribute testing and editing. Desktop object settings can be edited individually or globally. The uninstaller can delete all files and objects associated with an application, including removed associated Workplace Shell objects; it can also deregister object classes associated with an application, remove their DLLs, and remove CONFIG.SYS entries that the application has added. There's even a reinstaller if you change your mind. UniMaint's application mover can transfer a program's files from one partition to another, making any changes necessary to .INI files and CONFIG.SYS to point to an application's new location.

OS/2, NT, and Win 3.x Utilities

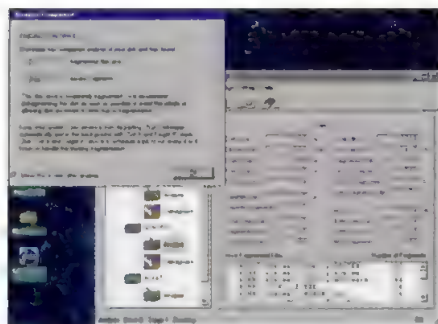
WINDOWS NT
utilities

The enterprise focus of NT and the differences of the NTFS file system provide a market for unique tools. BY BRIAN PROFFIT

ANTI-VIRUS

Dr. Solomon's Anti-Virus Toolkit (\$85; Dr. Solomon's Software Inc., 888-377-6566; www.drsolomon.com) checks executable files and macros whenever they are executed, copied, opened, or renamed. The program can also scan files when they are written—a safety net for downloading files or decompressing archives. The toolkit checks for boot sector and partition definition sector viruses, too, even in NTFS partitions. Dr. Solomon's detects more viruses than its competition and produces fewer false positives.

Inoculan (single server, \$995; up to five servers, \$3,995; Cheyenne Software Inc., 800-243-9462; www.cheyenne.com) is an extremely complete enterprise solution. Users trying to copy an infected file to the server are automatically suspended, so the virus re-



Diskeeper can defragment your hard disk automatically at preset intervals.

mains isolated until the administrator can disinfect the user's machine. Alerts can be broadcast to specific machines or domains, sent to a pager, printed on any network printer, e-mailed, or sent to any SNMP manager. Software and virus signature updates can be downloaded automatically and then transferred to all Inoculan servers. Inoculan integrates with Netscape Navigator and Microsoft Internet Explorer to check Web page or FTP downloads while they are in progress.

McAfee AntiVirus (\$65; McAfee Associates Inc., 408-988-3832; www.mcafee.com) scans both FAT and NTFS partitions on a local machine and remotely on the network. It can check floppy disk boot sectors, CD-ROMS, and files within compressed archives.

Norton AntiVirus NT (\$69.95; Symantec Corp., 800-441-7234; www.symantec.com) scans when files are downloaded, opened, created, modified, or run. A single mouse click downloads updates over the Internet.

BACKUP

ARCserve (workstation, \$295; server, \$795; Cheyenne Software Inc., 800-243-9462; www.cheyenne.com) is an industrial-strength product designed for the enterprise, providing RAID support for tape drives. ARCserve achieves an extremely high data-transfer rate by writing directly to the SCSI miniport, bypassing the device driver and file system. It supports quick file access and compression, too.

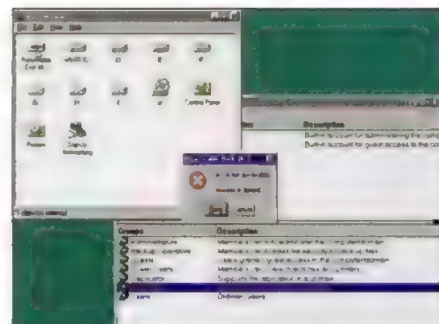
Automated handling of backup schemes combined with support for backup units with autochangers allows for complete "lights-out" use, including automatic drive-cleaning runs. Data that exceeds the capacity of one tape can span automatically to another drive on the same server. ARCserve's complete disaster recovery allows reloading a server without reinstalling the operating system. Alerts can be broadcast to specific machines or domains, sent to a pager, printed on any network printer, e-mailed, or sent to any SNMP manager.

Legato Data Backup Utility (\$20; Legato Systems Inc., 415-812-6000; www.legato.com) provides a good, relatively configurable backup solution for a single server. The catalog information can be migrated easily to the enterprise version, Legato NetWorker, which offers a rich set of functions for network administrators and integrates with Microsoft BackOffice for easy backup of SQL Server and Exchange Server systems.

DISK MANAGEMENT

Diskeeper (workstation, \$125; server, \$399; Executive Software International Inc., 800-829-4357; www.execsoft.com) supports both FAT and NTFS partitions and can be configured to run at preset intervals to keep your hard disk defragmented. It can even be set to run continuously at low priority; that's particularly handy for keeping high-activity servers defragmented for top performance.

Norton Utilities (\$99; Symantec Corp., 800-441-7234; www.symantec.com) is a Windows NT version of Symantec's popular tool package. System Doctor monitors a workstation or server and provides information on any workstation on the network. Internet



Smart Security lets administrators control access to floppy or other removable drives.

Speedometers track access time to Web sites and data turnaround time; the self-monitoring tool warns when a hard disk failure appears likely, so that data can be backed up.

System Doctor also notifies the user when drives need to be optimized. Norton Disk Doctor and Norton Speed Disk include support for both NTFS and FAT drives. Norton Utilities can be updated automatically from Symantec's Web site with a single click. Norton Protection/UnErase runs in the background and protects deleted files—even those that aren't sent to Windows NT's Recycle Bin.

Quota Manager (\$495; NTP Software, 800-226-2755; www.ntpsoftware.com) lets administrators manage network disk resources on Windows NT servers by setting and enforcing disk-space quotas for any file, directory, or network share name. Quotas can be assigned by group or individual, as can exceptions, allowing a user or group to exceed a specified quota. Quota Manager is excellent for preventing user directories from growing out of control. It issues a warning when objects approach their limits, and users can view the quota status to determine how close they are.

SYSTEM

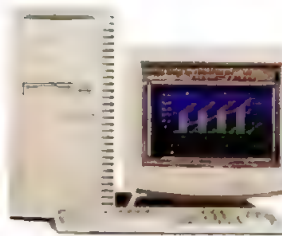
Norton NT Tools (\$49.95; Symantec Corp., 800-441-7234; www.symantec.com) includes Norton AntiVirus Scanner (with NTFS support), Norton File Manager, and Norton System Doctor. AntiVirus scans executables and Word macros but doesn't include a background program for continuous monitoring. Norton File Manager includes a graphical front end to simplify all file actions, including accessing .ZIP archives, accessing FTP sites as though they were network drives, file encryption, directory comparison, and uuencode and decode, for

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OS/2, NT, and Win 3.x Utilities

sending binary files across the Internet. Norton System Doctor tracks performance information, such as cache hits and memory usage. The program can be configured to sound an alarm when items tracked match user-defined criteria, such as page file size.

One of the best forms of security is simply to disable any device that can bring new data into the computer. That's the technique **Smart Security** (\$25; Insight Software, 801-295-1890; www.wintools.com) uses, by allowing an administrator to prevent individuals or groups from accessing floppy disk drives (or other removable media identified by Windows NT as floppy disks), CD-ROM drives, removable disks not identified as floppy disks, serial ports, or parallel ports.

Windows NT ResourceKit (workstation, \$69.95; server, \$149.95; Microsoft Press, www.microsoft.com) is a book/CD-ROM package that provides unparalleled information on topics such as deployment, architecture, security, optimization, file systems, performance, and troubleshooting, as well as more than 100 utilities, from registry management tools and a C2 Security Configuration Manager to more playful items, such as a 3-D paint program. The server version adds an SMTP and POP2/POP3 mail server and DHCP tools. This is an excellent collection, well worth the price.

DOS AND WINDOWS 3.x utilities

If you haven't yet moved to a more powerful operating environment, beef up your system with these handy tools. BY M. DAVID STONE AND EDWARD MENDELSON

The drive compression software of choice for DOS and Windows 3.x is **Stacker 4.1** (\$49 street; Stac Inc., 800-522-7822; www.stac.com). Stacker's advantage is simple: a compression ratio of up to 2.5:1, compared with 2:1 for DriveSpace. And Stacker uses only the space a file needs, while DriveSpace uses 512-byte chunks at a minimum.

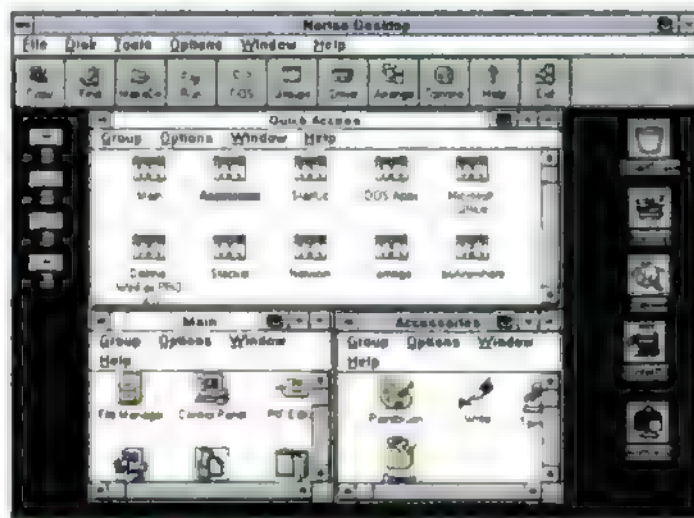
Norton AntiVirus 3.0 for Windows and DOS (\$49 street; Symantec Corp., 800-441-7234; www.symantec.com) is one of the better antivirus programs around. Not only does it claim to detect and remove every known virus, but you can download updates from Symantec's Web site for free.

Norton Desktop 3.0 for Windows (\$120 street; Symantec Corp.) replaces Program Manager and File Manager with a more ca-

pable desktop and improved file management. Conveniences include nested program groups, built-in file viewers, and .ZIP-compatible file compression. You also get a PIM (with a to-do list, calendar, and phone book) and lots of utilities, including Disk Doctor, for diagnosing and fixing disk problems, and a subset of the Norton AntiVirus programs.

The Norton Utilities (\$119 street; Symantec Corp.) have a long history of helping to save data—they offered an Unerase utility long before DOS provided UNDELETE. Version 8.0 for Windows and DOS includes the Norton Classic Utilities, plus additional features that range from NDOS, a beefed-up replacement for COMMAND.COM, to a set of programs for maintaining WIN.INI and SYSTEM.INI. Also included are versions of Disk Doctor and Speed Disk that run in the background for continuous file-system repair and disk optimization. Despite some overlap with Norton Desktop, there are enough differences to justify having both programs.

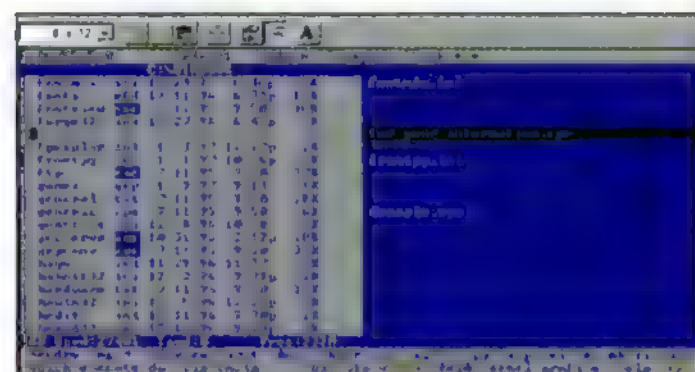
For a quick look at the insides of a file, nothing's quicker than Vernon Buerge's classic DOS-based **List** (Buerge Computers and Software, 707-769-5477; www.buerge.com). **List Plus** (\$37) displays files up to



Norton Desktop gives you a more capable desktop and improved file management.

16MB in text or hexadecimal mode, searches, cuts and pastes text strings, and performs basic file management. **List Enhanced** (\$99) adds the ability to view files up to 500MB and perform a "sweep" action on groups of files. There's nothing fancy about List—just dazzling speed and unmatched convenience.

QDR (Quick Disk Reformatter) is a free-ware gem also from Vernon Buerge. The minimal DOS utility quickly deletes all files and directories from a floppy disk. While downloading QDR, check out the free **FV**, the world's fastest .ZIP-file directory lister.



CMFile, a speedy file manager for DOS, even supports Windows 95 long filenames.

The best way to manage your files under Windows is to open a DOS box and run **CMFile** (\$30; NoVaSoft; ourworld.compuserve.com/homepages/novasoft2). The program views, manages, edits, splits, and launches files—it also compares files and directories—all at top speed. CMFile even supports Windows 95 long filenames. Its interface isn't elegant, but no commercial file manager can compete with its speed and feature set.—EM

Another Change Directory (free; A. Merckens; peacock.gac.peachnet.edu/~giles/free-dos.html) jumps about among drives and directories, performs an intelligent best-guess when it can't find an exact match, displays a pop-up list of possible matches for a string you enter—generally making it effortless to browse your disk.

Every .ZIP file in the world is compatible with the compression utility **PKZIP 2.04g** (\$47; PKWare). The DOS-based version (preferred by power users) effortlessly creates and extracts .ZIP files, including those that span multiple disks. Download it from anywhere, or order the disk and manual from www.pkware.com. The one thing that PKZIP can't handle is long filenames, which it truncates to short DOS names. But **UNZIP** (free; Info-Zip; www.cdrom.com/pub/infzip) handles them perfectly.

4DOS (\$69; JP Software; www.jpsoft.com) is a fast, elegant, powerful, customizable, and easy-to-use replacement for COMMAND.COM that's fully compatible with Windows 95.

The ultimate enhancement for the DOS command line is **PCED** (\$35; Cove Software, 410-992-9371). PCED supplements COMMAND.COM instead of replacing it, so it requires extra memory. But PCED's internal batch-file style "synonyms" are more powerful than 4DOS's, and the program lets you nest synonyms for ultrafast batch processing. The program is fully compatible with Windows 95. □

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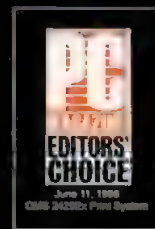
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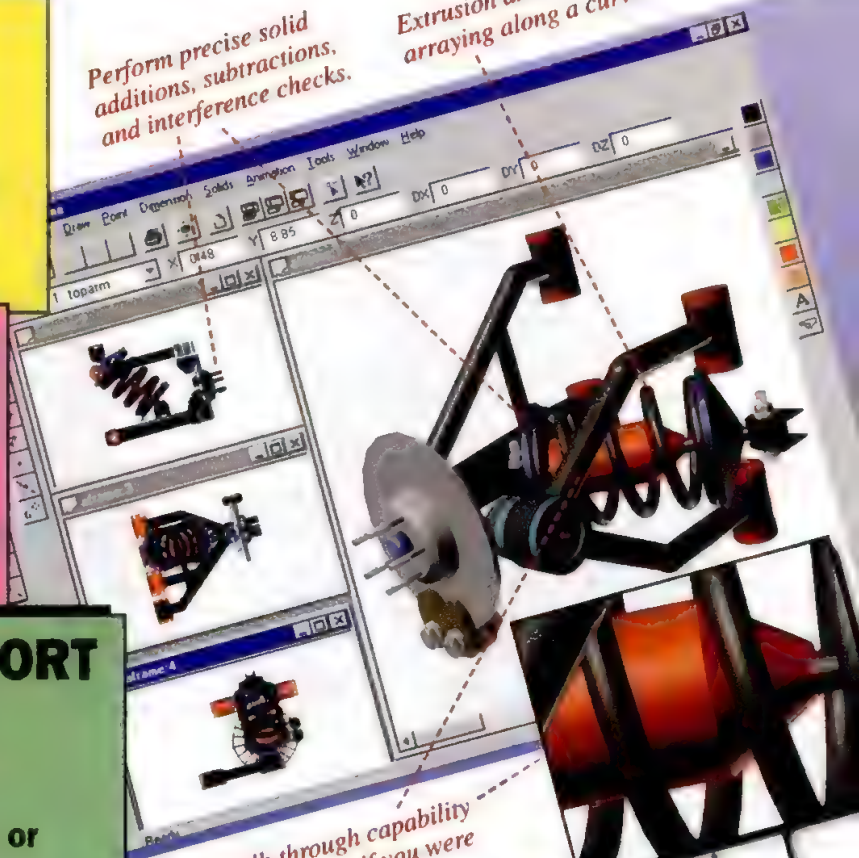
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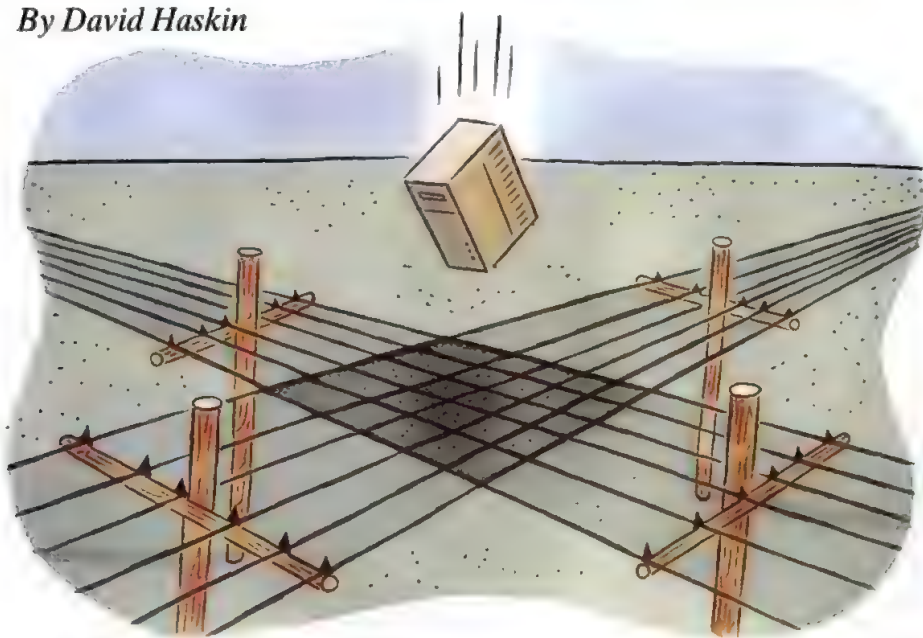
PC Tech

THE DEFINITIVE GUIDE TO PC TECHNOLOGIES & TOOLS

Web Backup Tools

Backing up over the Internet may be the ultimate off-site storage solution.

By David Haskin



Backing up to a tape or a removable-media drive is fast but has its perils. Fire and flood can destroy removable media, and spies can steal them. When you are traveling, you can't back up or restore your data. And, of course, tape and removable-media drives are expensive and take time to install and maintain.

We do everything else on the Internet. Why not back up our files there? That would be true off-site backup. Fires and other perils can't harm your data, and travelers can back up and restore files from virtually anywhere.

True, this method has its own unique problems. You can't back up and restore when your network connection is down, and the process can be slow, particularly if you use a dial-up connection.

The process requires two components: client backup software and a remote server to which you send your files. In theory, standard end-user backup software could back up over the Internet, but so far few backup software vendors have added those capabilities. In addition to standard backup features, such as scheduling

IN THIS SECTION



TUTOR Jeff Prorise wraps up a series of articles showing you how to create a simple tic-tac-toe game in Microsoft Visual C++. This time, you learn how to give the program the ability to load and save games, add a prompt asking if you'd like to save your current game when you quit the program, and create a custom icon for the program. *Page 273.*



OPERATING SYSTEMS FAT32, a new extension of Win/DOS's FAT file system, was quietly released with the versions of Windows 95 shipping with new computers. Find out what the problems of the old FAT were, what FAT32 does to solve them, and other advantages and disadvantages of the new file system. *Page 279.*



POWER PROGRAMMING Web database connections are one of the hot topics of the Internet these days. In this column, we demonstrate how to implement a middleware SQL gateway between a Web server and a database server using Powersoft's Optima++ development tool. *Page 287.*



UTILITIES In this issue, we take a look back at some of the standout utilities from *PC Magazine's* past and give you some insight into the process of selecting, creating, testing, and writing about our free software. We even throw in a handy miniutility. *Page 297.*

ALSO IN THIS ISSUE In *PC Solutions*, we tell you how it's possible for memory to be too fast, explain how to create a Web page without using a HTML editor, show you how to add graphical logos to your Excel headers, and much more. *Page 303.*

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and creating sets of files for backup, Internet backup programs must offer a way for you to specify a directory on an FTP server for your backups. They must also allow you to connect to that server via direct network or dial-up connection, depending on your setup.

File compression, which most standard backup packages offer, is essential, since you are renting space on a server. For security, the software should encrypt your data. Unless otherwise noted, all the clients in this roundup provide encryption, typically in the form of private key/public key algorithms. Furthermore, your vendor's server should be mirrored so that you can access your data even if the server is down.

There are two common ways in which vendors market Internet backup services. One is proprietary: You use specific software to back up to a specific service. Typically, the vendor provides the software free and charges for the storage space. For end users who want to back up only data files (as opposed to full system backups), the cost typically is between \$10 and \$20 per month for between 10MB and 50MB of storage space. One advantage of the proprietary method is that the client software works with the host to make incremental backups more efficient; typically, only changes to files are backed up. That, in turn, lessens the time it takes to back up and requires less server space.

The other common approach is software that can back up to any server. This is handy, because some service providers make free storage space available, and if you're paying for space, you're not locked into a specific service—you can buy storage from the lowest bidder. But the software isn't free, and it won't be as finely tuned as the proprietary services' software to minimize the overhead of incremental backups.

There is a third approach—backing up via e-mail—but it's not very practical. It requires you to compress and encrypt the data yourself, if you wish, and then e-mail it to your service. We do not reviewed this type of software here.

We found that all the proprietary software and services are useful and reasonably priced, but in every case the software needs to evolve. The services we reviewed include XactLab Corp.'s Atrieva, Connected Corp.'s Connected Online Backup, and Surefind Information's Surefind. We also reviewed NetBack, which offers some unique capabilities and doesn't require proprietary software.

We found that software for generic Internet backup, as a group, is more powerful and usable than proprietary software. In this roundup, we reviewed Hot Wire Data Security's BackupNet (which requires a server component), Edge Publishing's InterBack for Windows 95, and McAfee Associates' QuickBackup.

Internet backup remains an emerging area, so there are many differences in approach and quality. Before you invest your time and money, make sure you pick the right combination of service and software.

Editors' Choice

- Backup service: Connected Online Backup 2.0
- Backup software: QuickBackup



We examined two broad types of Internet backup solutions: proprietary services in which you rent server space and use proprietary backup software, and generic

backup software tuned to work with the Internet. In the proprietary server/software group, Connected Online Backup is the clear leader for its range of services. It is the only service available both via the Internet and via a private network (although Surefind will soon offer both as well). Connected offers handy extras, such as the ability to set up archived files for access by others, making it a secure way to transfer files.

Like the other software in this roundup, Connected's proprietary software needs polish. In particular, the program should support multiple backup sets, and selecting files to back up should be easier. But it will suffice for most users and, frankly, no other proprietary software in this roundup was better.

The other services are worthy of note. XactLabs' Atrieva and Surefind don't match the range of Connected's services. Still, they offer reliable service at a reasonable price. NetBack is unique, because you can use your browser to access a list of files in your remote storage directory. In effect,

this makes NetBack a remote hard disk, which can be a tremendous help when traveling.

Among generic Internet backup software solutions, McAfee Associates' QuickBackup did the best job of combining power and ease of use. The program uses wizards for creating backup sets, and it supports basic backup features, such as the ability to include and exclude specific file types. It compresses and encrypts your data, and it has the most flexible scheduler in the group. QuickBackup is missing basic features, however, such as the ability to restore files to the folders of your choice. But if you use Internet storage space that doesn't require proprietary software, QuickBackup is your best choice.

Hot Wire Data Security's BackupNet is a promising newcomer. This free software is the simplest to use, with a clean, Explorer-like interface. Its unique client/server technology increases the speed of incrementally backing up files. Only a few services support BackupNet's server component, although the vendor is setting up its own service.

XactLabs Corp.

Atrieva

In Atrieva, XactLabs Corp. provides a thorough proprietary backup service that has some rough edges. The Atrieva software, like that of most other backup services, encrypts and compresses files. It also scans for viruses during uploads and downloads.

The free software sports a tabbed interface reminiscent of Windows 95 Explorer. Conveniently, the program has a wizard for creating backup sets that walk you through the process of selecting the drives and file types to save. Each backup set can have its own schedule. The software can't schedule a set for more frequent backup than daily, but you can create multiple backup sets for mission-critical data and schedule them throughout the day.

Atrieva is relatively new in the software end of things—the Windows 95 version has been available only since last October—and that is apparent in the rough edges and missing features. The software can't restore files to

their original directories; only to a special local restore directory. The purpose is valid—to avoid overwriting existing files—but that's a clumsy way to accomplish it.

While the version we examined looked a bit like Explorer and supported long filenames, there wasn't much else about it that was tailored to Windows 95. The program makes no use of right-click context menus. And although Atrieva can dial your service provider auto-



Atrieva's proprietary software looks good initially, but fine-tuning backups can be confusing.

matically, it can't use Windows 95's precreated dial-up connections. You must give the program your log-on and related information.

There is also a lot of vagueness in the interface. One example is the Filters dialog box: It's not obvious whether the program is filtering files *out of* backup sets or putting them *into* the sets. Also, the status reports that the program issues during the backup process are unclear. The vendor promises that a new version, which should be available about the time you read this, will remove many of these annoyances.

At this writing, XactLabs provides a generous 90-day free trial. After that, the basic plan costs \$9.95 per month for each 25MB of storage. **Atrieva.** List price: Software, free; 25MB of storage, \$9.95 per month. XactLabs Corp., Seattle, WA; 206-654-5300; www.xactlabs.com. *Circle 456 on reader service card.*

Hot Wire Data Security Inc.

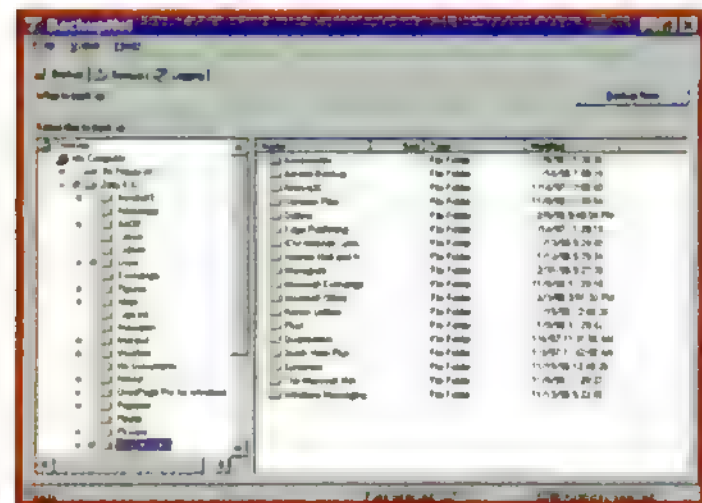
BackupNet

BackupNet 1.0 is both proprietary and generic—it works with any server that supports the vendor's client/server technology. So far, only a few storage services offer this support, but Hot Wire is setting up a commercial backup server of its own.

BackupNet is hands down the easiest software to use in this group, and it has some of the spiffiest technology. The interface is similar to Microsoft's Backup, with a tab for creating your backup set, another for restoring files, and a third for viewing backup and restore logs. To select files, you simply click on a box next to a drive, a folder, or an individual file.

BackupNet is reasonably flexible. You can set the compression level and determine which portions of transactions are encrypted. You can schedule backups for a different time each day, though not more frequently than daily, and you can't create multiple backup sets.

What sets BackupNet apart is the speed of its incremental backups, an important factor when backing up over the Internet. The product accomplishes its speed with proprietary technology at both ends of the transaction—the server and the local PC. The program stores incremental changes to files in both places so that the processing occurs more



BackupNet's Explorer-like interface is the easiest to use.

quickly. You can further reduce storage requirements by having BackupNet delete locally stored increments if files remain unchanged after a specified number of backups.

On our tests with a dial-up connection, BackupNet incrementally backed up files the size of this article in seconds after connecting to the FTP server. But this technology is still slow at connecting with the remote server and negotiating such items as encryption and decryption.

If you don't require complex scheduling abilities or multiple backup sets, BackupNet's simplicity and speed make it worth the effort to locate a service that supports it.

BackupNet 1.0. List price: Free. Hot Wire Data Security Inc., Allentown, PA; 888-468-9473; www.hotwire.net. *Circle 457 on reader service card.*

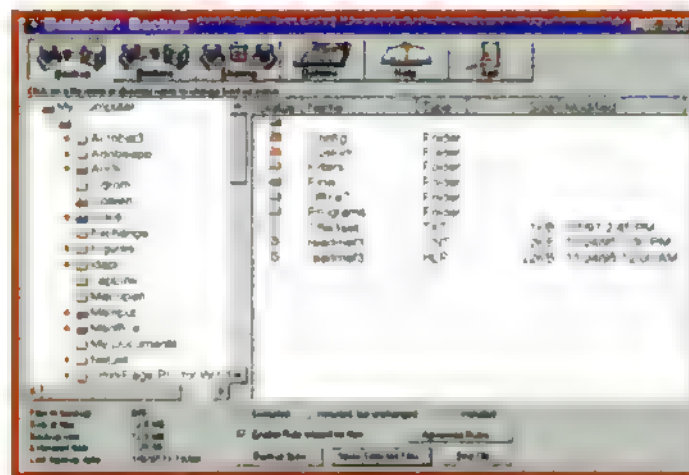
Connected Corp.

Connected Online Backup



Connected Online Backup 2.0 (formerly DataSafe), from Connected Corp., is a thorough, sophisticated, and reasonably priced proprietary backup system.

As with most proprietary systems, the software is free, and you pay for server storage space. Besides connecting through the Internet, you can access the service via Connected's private network;



Connected's proprietary software is reasonably powerful, though it is sometimes difficult for tasks like filtering files in or out of backup sets.

at present, it has about 400 points of presence.

Setting up the Windows 95 software is a breeze (Windows 3.1 software is available, too, and a Macintosh version is in development). During installation, Connected can optionally find all your data files; it looks for obvious data extensions, such as .DOC and .INI. The product knew enough to back up Quicken data files, but some of its other choices seemed arbitrary. For example, it chose to back up .PCX images but not .BMP files. You can set your own rules to include or exclude specific directories and file types, and you can exclude files modified before a specific date.

The Windows 95 version we looked at uses standard dial-up connections and has an Explorer-like interface. It supports long filenames but not context menus. You can schedule back-

ups as often as once a day, but not more frequently than that. Conveniently, you can search for specific files by name. The software, however, doesn't support multiple backup sets, and its tabbed dialog box for determining which files to back up, while thorough, is confusing.

Beyond the software, the service offers more conveniences than its competitors. For lengthy restores, Connected offers a \$24.95 CD-ROM containing all your backed-up files. This serves as a faster option when you back up many files. You can even set the software to order the CD-ROM automatically if the estimated backup time exceeds a specific length. You can grant permission to others to access your backed-up files from directories you specify, which makes the service a rudimentary file transfer system. You can also set the software to download updates automatically as they become available.

Connected's prices are reasonable: \$14.95 per month for 50MB of storage and 25 cents per megabyte above that amount. Uniquely, Connected measures the amount of data that comes and goes from the server rather than how much you store. The system compresses data, although for billing it counts only uncompressed file size. But since the Connected system uses delta block technology for backing up only changes to files, the basic plan provides more storage than most end users will need.

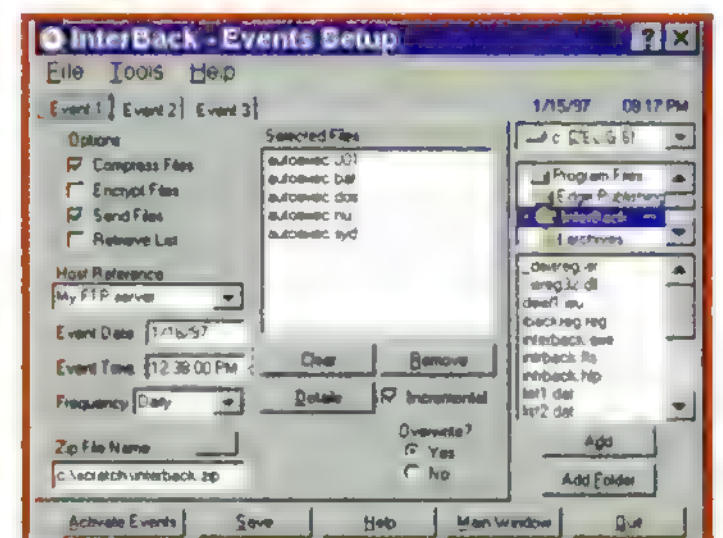
Connected Online Backup 2.0. List price: Software, free; 50MB storage, \$14.95 per month. Connected Corp., Framingham, MA; 800-353-3078; www.connected.com. *Circle 458 on reader service card.*

Edge Publishing Inc.

InterBack for Windows 95

InterBack for Windows 95, from Edge Publishing, is standalone software for backing up your data over the Internet. In fact, some nonproprietary Web backup services, such as NetBack, make it available from their sites.

InterBack, however, is less a backup utility than an FTP client that focuses on uploading files to the server of your choice. During setup, you specify the FTP server and directory to which you want to back up. InterBack comes



InterBack compresses and encrypts files for you, then backs them up to the server of your choice. But its interface is dense and inefficient.



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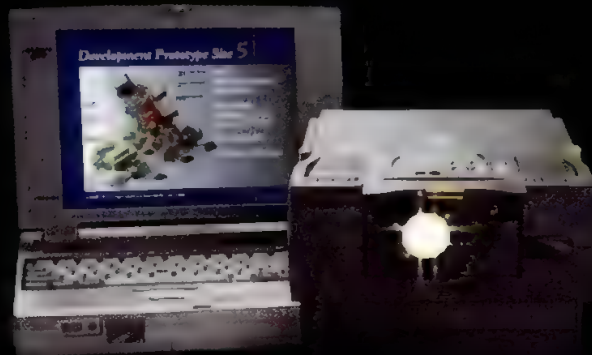
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with one interface for compressing files into a PKZIP-compatible format and another for applying DES encryption to the .ZIP file. After performing these tasks, you begin the transfer.

InterBack's flexibility lets you create profiles for up to three FTP servers, so you can back up data files to one server and system files to another. Similarly, you can schedule three events, which in essence lets you create up to three backup sets. Scheduling is flexible, enabling you to back up each set regularly through the day.

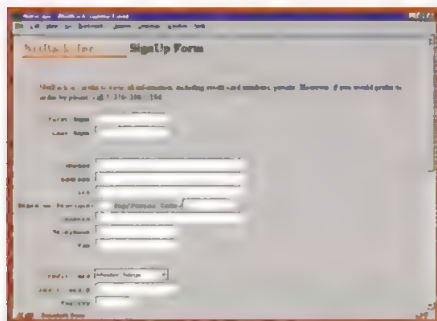
InterBack is clumsy. Compressing your files manually when you want to back them up is unnecessarily time-consuming. Also, the interface is cluttered and confusing. But if you don't want to commit to a proprietary Internet backup service, InterBack does make sense. **InterBack for Windows 95.** List price: \$48. Edge Publishing Inc., Billings, MT; 406-252-2640; www.edgepub.com. Circle 459 on reader service card.

NetBack Inc.

NetBack

NetBack, from NetBack Inc., is unique among the backup services in this roundup. It isn't proprietary, and you can use any backup software you want, as long as it can send data to an FTP server.

Another unique aspect of this service is that you can access your own password-protected FTP directory with your Web browser. Clicking on a file in your directory automatically



With NetBack, you sign up for the service and choose your own client software.

loads the file locally, after which you can save it locally. You can back up files to your displayed FTP page by dragging them from File Manager or Windows 95 Explorer. That means, in essence, that NetBack can act like a remote hard disk that you can access from airplanes, hotels, or wherever you happen to be.

NetBack has no built-in compression or encryption on the server side. You must use your own backup software for those capabilities. From NetBack's Web site, you can download a variety of backup products (including InterBack, also reviewed here).

NetBack's trial plan is an innovative marketing feature. You can try out the service free for an unlimited amount of time. NetBack pro-

vides half a megabyte of free storage space on an unlimited basis. Besides helping you decide whether the service is worthwhile, the free service is a handy way to exchange files with anyone to whom you've given your password.

NetBack's fees start at \$9.95 per month for 25MB of data, with a 50-cent-per-megabyte charge beyond that. You can rent 100MB of storage for \$35.95 per month, and still higher-volume options are available. For those who have backup software that encrypts and compresses data, NetBack is a solid choice.

NetBack. List price: 25MB of storage, \$9.95 per month. NetBack Inc., Venice, CA; 310-396-1194; www.netback.com. Circle 460 on reader service card.

McAfee Associates Inc.

QuickBackup



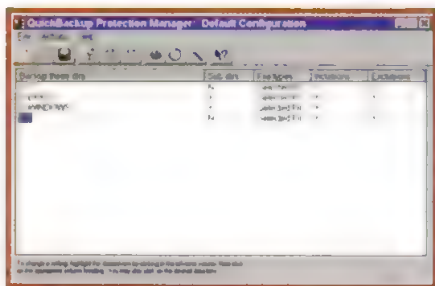
QuickBackup (formerly Web-Stor), from McAfee Associates, takes an à la carte approach. You can use the product either with McAfee's Personal Vault service or with the FTP site of your choice.

QuickBackup is simple to use yet powerful enough for most users. It has a wizard for selecting drives, files, and file types for backup. You can select for inclusion or exclusion. The program didn't include .DOC files in the list of registered file types, but we were able to include those files in another dialog box.

The software has the most flexible scheduler in the group. You can set it to back up as frequently as every hour. You can also direct the program to back up when the computer has been idle for a specified period, or when a backup hasn't been performed during a specified period. QuickBackup has fallback scheduling, so if a backup can't occur when you've specified—if, for example, your Internet connection is down—you can have the program notify you that the backup didn't occur, skip the backup entirely, or run the backup the next time the computer has been idle for a specified period.

QuickBackup has a separate restore module that lists only the files you've backed up. Unfortunately, this module only restores files to their original locations, not to others you specify.

McAfee also offers its Personal Vault service at \$10 per month for 30MB of storage.



QuickBackup has a simple interface, but it is reasonably full-featured.

QuickBackup. List price: \$40. McAfee Associates Inc., San Jose, CA; 408-988-3832; www.mcafee.com. Circle 461 on reader service card.

Surefind Information Inc.

Surefind

At this writing, Surefind supports only private connections via CompuServe's dial-up network, but the company is about to start testing Internet connections to its proprietary backup service, and those connections should be available by the time you read this. The software won't change appreciably when the company adds Internet connections.

Surefind's free software is most notable for the thoroughness of its installation process. The setup wizard covers virtually every item, from your password and encryption key to selecting



Surefind's software supports long filenames but has a decidedly Windows 3.x feel.

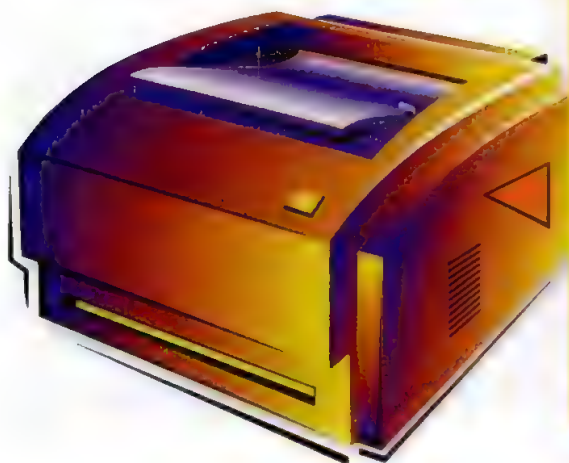
files and taking your credit card number for payment. Unfortunately, if you want to change aspects of the software's setup later, you must often go through this lengthy wizard again—even if you want to change just a single item.

Although the Surefind software supports long filenames, it still retains the feel of a Windows 3.x program. There are, for example, no Windows 95 niceties like context menus. Nor is the software particularly flexible. You can include or exclude individual files and folders, but including or excluding file types is awkward. Nor can you create multiple backup sets or schedule backups more often than daily.

What Surefind offers is good service—via a toll-free support number—and a reasonable price. In your first month with the service, you can back up as much as 100MB. After that, the basic plan costs \$9.95 per month for a single weekly backup consisting of up to 5MB of incremental data, measuring uncompressed file size; additional storage costs 50 cents per megabyte. For \$10 more, you receive an unlimited number of incremental backups totaling up to 20MB a week. Since these are incremental backups, either plan should suffice for most users. □

Surefind. List price: Software, free; one weekly backup of up to 5MB, \$9.95 per month. Surefind Information Inc., Cannonsburg, PA; 800-787-0009; www.surefind.com. Circle 462 on reader service card.

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By Jeff Prosis

Building Applications with Visual C++, Part 5

Adding the finishing touches to our application.

It's time to put the finishing touches on the tic-tac-toe application we've been building for the past several issues.

Writing this simple Windows application using Microsoft's Visual C++ compiler has certainly taught us a great deal about Windows programming with MFC. We've learned about the document/view programming paradigm and how it forms the foundation for most Visual C++ applications. We've also seen firsthand how to modify the document and view classes that AppWizard creates and how to tailor them to meet the needs of our application. In this final installment, we'll give users the ability to save and reload games in progress. Thanks to the support lent to us by the MFC application framework, we'll have to add only a few lines of code to the application to implement this important feature.

SERIALIZING THE DOCUMENT

For Windows applications crafted without MFC or a similar application framework, writing the code to implement the File menu's Open, Save, and Save As commands can be a lot of work. In a Visual C++ application, however, it can be downright simple. The framework takes care of the mundane stuff. It displays an Open or Save As dialog box to get a filename from the user, and it opens the file for reading and writing. To shield the programmer from the complexities of file I/O, the framework also creates an archive object from MFC's `CArchive` class and associates the archive with the file. The framework then calls the document's virtual `Serialize()` function, passing a reference to the `CArchive` object.

All you have to do to give a Visual C++ application the ability to load and save documents is override the `Serialize()` function in your derived document class and add code to archive the document's data members to or from the `CArchive` object. AppWizard provides a skeletal implementation of `Serialize()` that calls `CArchive::IsStoring()` to determine whether the document is being serialized to the archive (saved) or from the archive (loaded). What's more, MFC provides overloaded insertion and extraction operators, `<<` and `>>`, for serializing simple data types to and from an instance of `CArchive`. If `ar` is the variable name for a `CArchive` object,

then a pair of integers (data type `int`) named `m_nIndex` and `m_nVal` can be written to the archive with the following statement:

```
ar << m_nIndex << m_nVal;
```

Reading the variables back from the archive is just as easy:

```
ar >> m_nIndex >> m_nVal;
```

In many cases, adding serialization support to a Visual C++ application is that simple. For more complex applications, you can even write serializable classes that can be archived as easily as `ints` and other primitive data types.

In Part 3, I explained how the Tic document stores its data in a pair of member variables: a 5-by-5 array of `BYTES`, which stores the X's and O's the user enters, and a `BOOL` variable, which tells the application whose turn it is.

Serializing a tic-tac-toe game is a simple matter of serializing those two data members. Figure 1 shows how the document's `Serialize()` function looks after it's modified to serialize `CTicDoc::m_grid` and `CTicDoc::m_bXsTurn` to or from the archive. The values in the `m_grid` array are serialized one by one in a nested `for` loop; `m_bXsTurn` is serialized immediately afterward. It doesn't matter which data member is serialized first, as long as you're consistent. If you write `m_bXsTurn` to the archive before `m_grid`, then you must also read it first from the archive.

Modify your application's `CTicDoc::Serialize()`, so that it looks like the one in Figure 1, and rebuild the application. Then test the program by placing a few X's and O's in a document, saving it to disk, selecting File | New to create a new document, and reloading the document you saved a moment ago. The saved document should have all its X's and O's intact. Because we serialized `m_bXsTurn` as well as `m_grid`, the document should also remember whose turn it is.

THE MODIFIED FLAG

As a safeguard against accidental data loss, a well-behaved Windows application should give a user a chance to save any unsaved data if the application is com-

manded to shut down. In a document/view application, MFC takes care of that little detail for you, but only if it knows when a document contains unsaved data.

You tell MFC that a document contains unsaved data by calling the document's `SetModifiedFlag()` function whenever you alter the document data. `SetModifiedFlag()` sets a flag inside the document, which the framework checks before the application is shut down or the current document is closed. If the flag is set, MFC displays a message box reminding the user of the unsaved changes and offers a chance to save the document before proceeding. Once the changes are saved, the flag is automatically reset, so the document is marked "clean" (unmodified) until `SetModifiedFlag()` is called again.

In Part 3 we also added to our document class a pair of functions named `AddX()` and `AddO()`, which the view calls to add an X or an O to the playing grid. To complete our application, we need to modify those functions to use `SetModifiedFlag()`. Figure 2 shows the modified source code. Once the calls to `SetModifiedFlag()` are inserted, the framework can tell whether a document is clean or dirty by checking the modified flag. And we don't need to worry about warning the user of unsaved changes to a document, because MFC will do that for us.

You can verify that the application works

```
void CTicDoc::Serialize(CArchive& ar)
{
    if (ar.IsStoring())
    {
        for (int i=0; i<5; i++)
            for (int j=0; j<5; j++)
                ar << m_grid[i][j];
        ar << m_bXsTurn;
    }
    else
    {
        for (int i=0; i<5; i++)
            for (int j=0; j<5; j++)
                ar >> m_grid[i][j];
        ar >> m_bXsTurn;
    }
}
```

FIGURE 1: The document's `Serialize()` function.


```

void CTicDoc::AddX (int i, int j)
{
    if ((i >= 0) && (i <= 4) && (j >= 0) && (j <= 4)) {
        m_grid[i][j] = 1;    // Add an X to the grid
        SetModifiedFlag (); // Set the document's
                             // modified flag
        m_bXsTurn = FALSE;  // O comes next
    }
}

void CTicDoc::AddO (int i, int j)
{
    if ((i >= 0) && (i <= 4) && (j >= 0) && (j <= 4)) {
        m_grid[i][j] = 2;    // Add an O to the grid
        SetModifiedFlag (); // Set the document's
                             // modified flag
        m_bXsTurn = TRUE;    // X comes next
    }
}

```

FIGURE 2: The modified *AddX()* and *AddO()* functions.

the way it's supposed to by rebuilding it, starting up the recompiled version, adding a few X's and O's, and then selecting Exit from the File menu. Before allowing the application to close, the framework will warn you about the unsaved data and give you the opportunity to save it or to cancel the shutdown process.

at the bottom of the screen.

Before closing, let's briefly review the steps we followed to create the application. In Part 1, we used AppWizard to generate a source code skeleton. In Part 2, we fleshed out the view's *OnDraw()* function to draw the playing grid and used ClassWizard to add to the view an *OnLButtonDown()* handler, which senses when a

GRAND FINALE

Our application is now entirely functional. To add a nice touch, go to the Project Workspace window and click the ResourceView tab to display a list of menus, icons, and other resources the application uses. Then double-click on *IDR_MAINFRAME* in the list of icons and use Visual C++'s built-in icon editor to give the icon your own distinctive look. (Be sure to edit both large and small versions!) When you've rebuilt the application, run it again. The edited icon should be visible in the Windows Taskbar,

square is clicked with the left mouse button. Next, we added member functions to the document class that the view can call to add an X or an O to a square, find out whose turn it is, and determine whether a square contains an X or an O. Last time, we wired the document and the view together so that clicking an empty square causes the view to add an X or an O to the document and display an X or an O in the window, and we updated *OnDraw()* to draw X's and O's. The final step, in this column, was to add logic to the document class for saving and reloading games.

That's it in a nutshell. I hope this series has given you a feel for what it takes to create a Windows application using MFC. Tic is rather simple, but it has many elements you would find in applications that are larger and more complex. You can download the completed application, along with its source code, from PC Magazine Online (see the sidebar "Getting the Files" in this issue's Utilities column for instructions). Download *Tic.zip* and unzip it with *PKUNZIP* (use the *-d* flag) to re-create the application and its source code on your hard disk. You can then use the Open Workspace command in Visual C++'s File menu to open the project and modify it as you see fit. □

Jeff Prosise is a contributing editor of PC Magazine.

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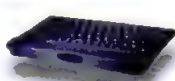
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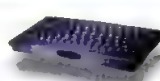
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PC Tech/Operating Systems

By Barry Simon

An Enhanced File System for Windows 95

FAT32 gives new life to the FAT file system.

In 1987, there was a crisis in the world of personal computing. The FAT file system, developed ten years earlier by Microsoft for its Standalone Disk Basic interpreter and later adapted to DOS, had been stretched to its limit. FAT could support hard disks only up to 32MB, making new, higher-capacity hard disks all but useless to PC users. Some third-party vendors provided their own ways of accommodating larger hard disks, but it wasn't until the release of DOS 4.0 that the crisis was resolved—for a while.

Significant changes in the structure of the file system in DOS 4.0 allowed the operating system to handle disks up to 128MB; minor extensions added later raised the limit to 2GB. At the time, that seemed like more storage space than anyone would ever need. But if the history of personal computing has shown one thing, it's that "more than anyone would ever need" quickly becomes "not nearly enough for serious work." And indeed, hard disks with a capacity of 2.5GB or more are now commonly available—and the once lofty and liberating 2GB ceiling has suddenly become another obstacle to be surmounted.

For Windows 95 systems, Microsoft has developed FAT32, a new extension of the FAT system that was quietly released with the OEM Service Pack 2. FAT32 is available only on new PCs and not as a Windows 95 upgrade, although Microsoft indicates it will be included in the major Windows upgrade (code-named Memphis) expected later this year. In this article, we'll review the general structure of FAT file systems, then take a look at what's new in FAT32. To avoid confusion, we'll use FAT16 to denote the older, 16-bit version.

DISK AREAS

The file system depends on a number of special areas of the disk set aside for organization when the disk is formatted: the *master boot record*, the *partition table*, the *boot record*, the *file allocation table* (from which the FAT system takes its name), and the *root directory*. At a low level, disks are organized into 512-byte groupings called *sectors*. The FAT system allocates space for files using a unit called a *cluster*, made up of an integral number of sectors. The number of sectors in a cluster must be a power of 2. (You can run CHKDSK or SCANDISK to see how big the clusters are on your system.) Microsoft calls these clusters *allocation units*, and SCANDISK's report includes a notation of their size, such as "16,384 bytes in each allocation unit." You can normally compute the cluster size by dividing the disk size by 64K (65,536 bytes) and rounding up to the nearest power of 2. Thus, a 1.2GB disk has clusters that are 32K in size: 1.2GB (1,258,291.2K) divided by 65,536 is 19.2K, which rounds up to 32K.

THE FAT CHAIN

The FAT is a database that associates clusters of disk space with files. It has one entry for each cluster. The first two entries contain information about the FAT. The third entry and those following are assigned to clusters of disk space, starting with the first cluster that is available for use by files. FAT entries may contain a few special values to indicate that

- the cluster is free—that is, not in use by a file (0000H for FAT16);
- the cluster contains one or more sectors that are physically damaged and should not be used (FFFFH for FAT16); and

- the cluster is the final cluster in a file (FFF8-FFFFH for FAT16).

For any cluster that is used by a file but is not the file's last cluster, the FAT entry contains the number of the next cluster used by the file.

Each directory, whether the root directory or a subdirectory, is also a database. A DOS directory has one main entry for each file (Windows 95 uses additional entries for long filenames). Unlike the FAT, where each entry has a single field, the entries for a file in a directory have multiple fields (see Figure 1). Some of the fields—name, extension, size, date, and time—can be displayed with the DIR command. But the FAT system relies on a field that DIR does not display—the number of the first cluster assigned to the file.

When a program asks the operating system to provide the contents of a file, the OS looks at the directory entry for the file to find the first cluster. It then looks at the FAT entry for that cluster to find the next cluster in the chain. Repeating this process until it encounters the last cluster for the file, the OS can compute exactly which clusters belong to the file and the order in which they fall. In this way, the OS can provide a program with any part of the file the program asks for. This way of organizing a file is called the *FAT chain*.

Under the FAT system, files are always allocated an integral number of clusters. On a 1.2GB hard disk with clusters of 32K, a text file containing only the words "hello, world" may have a directory listing of just 12 bytes, but the file will actually take up 32K of disk space. The unused part of the cluster is called *slack*. Small files may have slack equal to almost an

THE STRUCTURE OF A DIRECTORY ENTRY

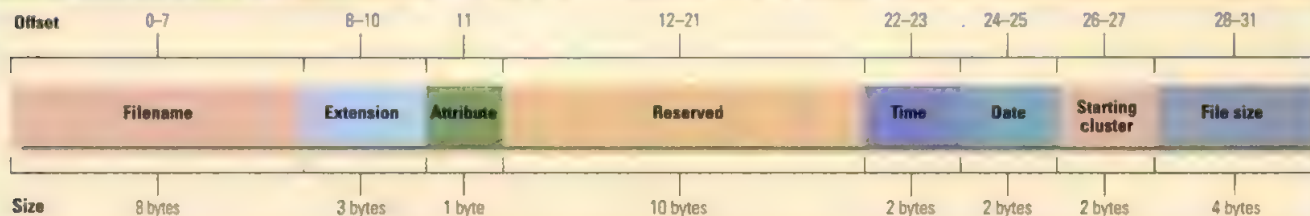


FIGURE 1: The 32-byte directory entry for a file consists of eight fields that contain basic information about the file, such as its size, its starting location on the disk, and the time and date it was last modified.

SECTOR AND CLUSTER LIMITATIONS IN FAT16

Disk size	Sectors per cluster		Cluster size	
	Decimal	Binary	Decimal	Binary
Less than 128MB	4	00000100	2K	0000100000000000
Less than 256MB	8	00001000	4K	0001000000000000
Less than 512MB	16	00010000	8K	0010000000000000
Less than 1GB	32	00100000	16K	0100000000000000
Less than 2GB	64	01000000	32K	1000000000000000
Less than 4GB	128	10000000	64K	ERROR: Problem for existing programs
4GB or more	256	ERROR: Problem for OS		

FIGURE 2: The 1 bit in the binary representation of the 8-bit sectors-per-cluster value moves left as the disk size increases. The 4GB error occurs when that 1 bit goes past the leftmost digit place. Cluster size is shown as a binary 16-bit quantity. Again, the 1 bit moves left, and the 2GB crisis comes when it moves past the left end.

entire cluster; on average, a file will have half a cluster of slack.

On an 850MB hard disk with 16K clusters, with a typical file size of about 50K, about 16 percent of the disk space allocated to files will be wasted in unused but allocated space. One of the ways a disk compression scheme, such as DriveSpace's, creates space is by recycling the disk's slack space for use by other files.

COUNTING SECTORS AND CLUSTERS

The original FAT file system in DOS 1 used 12-bit FAT entries. (The 12-bit FAT system is still in use today for floppy disks.) DOS 2, which added support for hard disks, shifted to 16-bit FAT entries. The problem that arose in 1987 had its root in the low-level operating system calls to retrieve a disk sector, which involved passing a 16-bit value as a parameter. There are 65,536 distinct 16-bit values; multiplying 65,536 by the 512 bytes in a sector yields 32MB. With regard to sectors on the disk, that was as far as the operating system could count. What DOS 4.0 did was change the low-level sector-handling to use 32-bit parameters.

The current 2GB limit is not actually an operating system problem; it is a problem with existing programs. A disk whose size is 2GB or larger would have clusters of 64K, or 65,536 bytes (see Figure 2). But the largest value that can fit into 16 bits is 65,535; 64K is too large. Microsoft discovered that many programs simply assumed that the number of bytes per cluster fits into 16 bits.

Even if the problem didn't exist at 2GB, the operating system would still balk at disks larger than 4GB. Under FAT16, the OS itself stores the number of sectors per cluster in a single byte in the disk parameter block that is set up by the OS. This number must be a power of 2, and it must be less than 256. Thus, the largest possible cluster size would be 128 sectors, or 64K. So even without the 2GB limit, FAT16 could still accommodate only disks under 4GB.

and the number of allowed sectors are the same, you might expect that FAT32, to minimize slack losses, would shift to clusters of one sector. But trade-offs must be made, so the FAT32 specification calls for 4K clusters for drives up to 8GB (see Figure 3).

For one thing, the size of the FAT itself becomes a factor. The operating system keeps two copies of the FAT, so each cluster requires 8 bytes for its FAT entries. On a 2GB disk, the FATs would take 32MB of disk space if clusters were only 512 bytes in size. With 4K clusters, the two FATs require only 4MB, a savings of 28MB.

But the trade-offs involve more than disk space; there are performance issues as well. VCACHE, the built-in disk cache, tries to keep the FAT in RAM for speedier disk access. Obviously, that's easier if individual FATs are 2MB instead of 16MB. You might worry that the larger number of clusters and doubling of

DISK SIZE VS. CLUSTER SIZE

Disk Size	Cluster Size
Less than 8GB	4K
Less than 16GB	8K
Less than 32GB	16K
32GB or more	32K

FIGURE 3: This shows the relationship between disk size and cluster size under FAT32.

FAT entry sizes would result in a less efficient VCACHE, but FAT32 is accompanied by a new cache-handling method that, according to Microsoft, increases overall performance.

OTHER CHANGES IN FAT32

To accommodate the larger number of possible clusters, the directory entry for each file must have 4 bytes for the starting cluster of the file, rather than the 2 bytes needed under FAT16. Traditionally, each directory entry is a 32-byte record (as shown in Figure 1). In the middle of the record are 10 bytes (bytes 12 to 21) that Microsoft has reserved for its own

With the introduction of FAT32, both the FAT entries and the sector numbering are now 32-bit. Here's what that means for you: 4,294,967,296 distinct 32-bit values multiplied by 512 bytes per sector yields a whopping 2 terabytes (2,199,023,255,552 bytes) as the maximum possible disk size under FAT32.

CUTTING SOME SLACK

Now that the number of allowed clusters

future use. Two of those bytes are now used to accommodate the extra bytes needed to specify the starting cluster under FAT32.

The operating system has always kept two copies of the FAT on disk but used only one. With FAT32, the OS can now use either copy. Another change is that the root directory, which used to be of fixed size and location on disk, is now free to grow as necessary, like a subdirectory. There is no longer a limit on the number of directory entries in the root directory. That's especially important, because each long filename uses multiple directory entries. (For details, see "How Windows 95 Stores Long Filenames," *PC Magazine*, June 25, 1996.)

The combination of a movable root directory and the use of both FAT copies offer the potential of smooth, dynamic resizing of a hard disk—to shrink a partition, for example, to make room for some other operating system. The new approach is safer than ones used by third-party programs to resize partitions under FAT16. (While Windows doesn't include a utility that takes advantage of the potential of FAT32, third-party products that do have been announced. They include PowerQuest's Partition Magic 3.0 and Quarterdeck's PartitionIt.)

CAVEATS

FAT32 is only available for Windows 95. Microsoft has not promised to support it under Windows NT and has hinted it will not do so. The company has stated, however, that if Windows NT 5.0 doesn't support FAT32, it will provide a utility to transform FAT32 disks to NTFS (Windows NT's native file system) so that upgraders won't be in trouble. But for now, if you want to use Windows NT and Windows 95 on the same machine, you need to be sure that any disk space shared by the two operating systems uses FAT16 and not FAT32, which Windows NT won't read, or NTFS, which Windows 95 won't read.

You should also be aware that because the size field in the directory entry is 32 bits, the size of an individual file is limited to 4GB.

Finally, any time the file system changes in a substantial way, you have to expect low-level disk utilities, such as the Norton Utilities, to break. Plan on upgrading them. File managers and viewers (such as Norton Navigator) should continue to work under FAT32.

If we stay with FAT32, it'll be another 15 years before we hit the 2-terabyte limit and need to move to FAT64. With talk of object-oriented file systems, we may confidently predict that by then we'll have moved beyond FAT—just as confidently as we might have predicted in 1987 that FAT would be gone before the 2GB limit was hit. □

Barry Simon is a contributing editor of PC Magazine.

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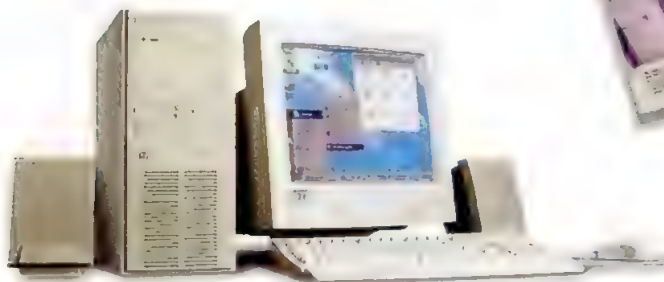
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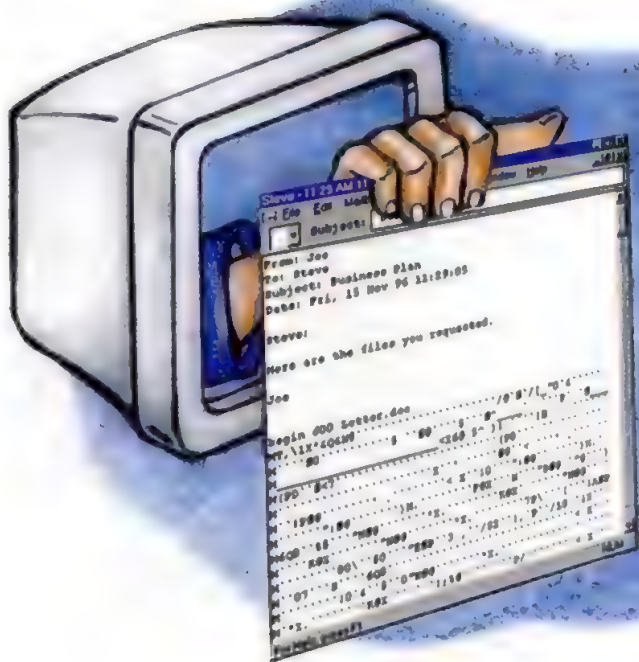


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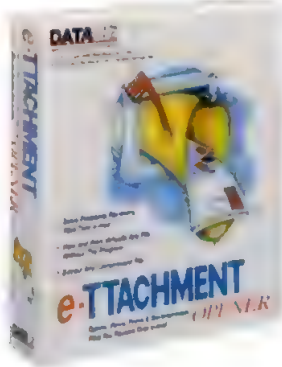
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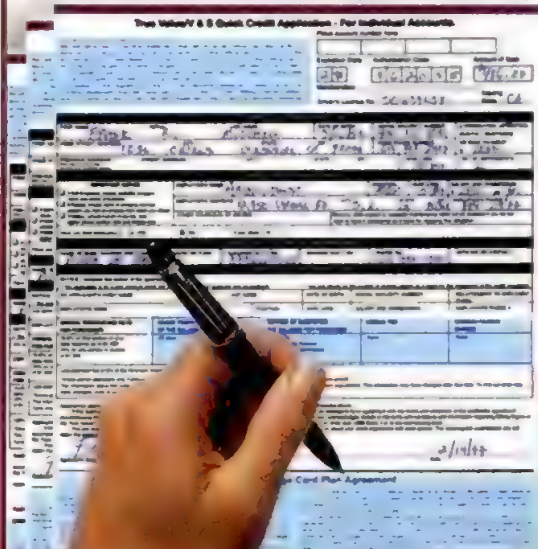
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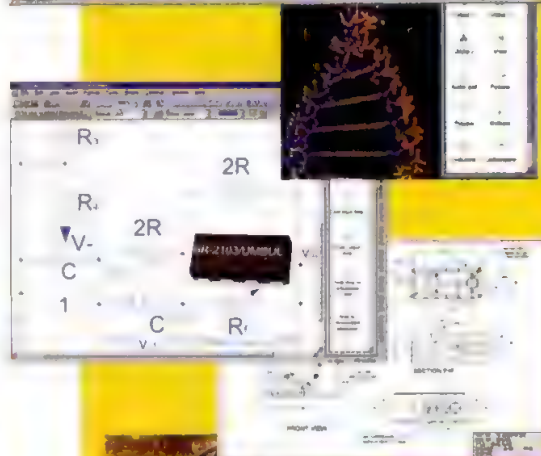
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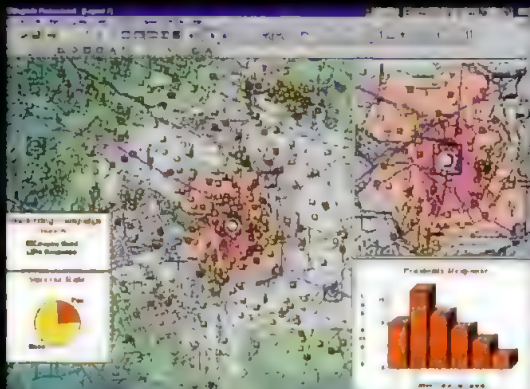
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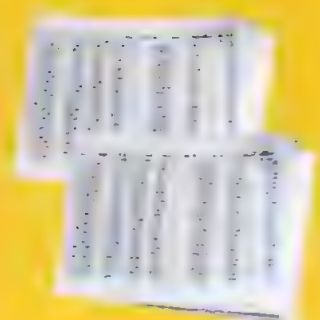


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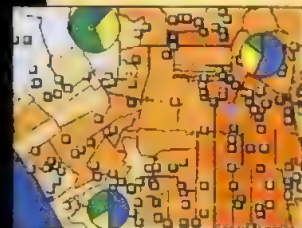
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Web Database Gateways

An Optima++ program integrates your local database with the Web.

Web SQL database development tools make up one of the fastest-growing categories of Internet software. These tools, which are quickly becoming Web middleware standards, function as gateways between the Web server and the database server. They add, delete, and retrieve records from a SQL database and format query results as HTML pages for the client browser software to render.

Web SQL database tools benefit developers who need to integrate complex in-house databases—which may have taken years to build—with a corporate intranet or the Internet. Numerous Web database tools are available: Allaire's Cold Fusion (www.allaire.com), Sybase's web.sql (www.sybase.com), NeXT Software's WebObjects (www.next.com), and Bluestone's Sapphire/Web (www.bluestone.com), to name just a few. Most are specifically developed or can be configured to use another important Web standard, CGI. This article will explain how Web database gateways work with CGI and how to build one for yourself with Optima++, Powersoft's C/C++ development tool.

CGI: A QUICK PRIMER

Traditionally the most common method of generating dynamic HTML data over the Web, CGI (Common Gateway Interface) is a standard Web server function rather than an actual application programming interface (Netscape's and Microsoft's Web servers support native server APIs, which allow a developer to create *dynamically linkable* server extensions). Although often bashed in the trade press as being too inefficient and archaic for new development, both CGI and HTML will continue to be used for quite some time, because they're supported by every major Web server and browser, and because they're relatively easy to use.

Since an abundance of CGI programming information is available on the Web (www.jmarshall.com/easy/cgi and hoohoo.ncsa.uiuc.edu/cgi/ are good places to start), I'll limit this brief discussion to one of CGI's most common uses: processing information from HTML forms.

```
<FORM METHOD="POST"
```

```
ACTION="/cgi-bin/cgiprogram.exe">
<P>
<B>First Name</B>
<INPUT TYPE="text" NAME="First_Name">
<P>
<B>Last Name</B>
<INPUT TYPE="text" NAME="Last_Name">
<P>
<INPUT TYPE="submit"
  VALUE="Search">
<input type="reset"
  value="reset values">
</FORM>
```

The above HTML code produces two text-entry boxes for first and last names, a Submit button to initiate a transaction, and a Reset button to clear the form. When a user submits the form, the Web server forks a new process (cgiprogram.exe) and re-directs the child process's standard input to accept a coded *name/value pair* string (generally of the form "name1=value1&name2=value2&...nameN=valueN"). It is the responsibility of the CGI program to parse the name/value pair string for further processing. Since our HTML form uses the POST method, it doesn't embed the name/value pair into the URL it sends to the Web server, as it would if we used the GET method (for example, [lookup.pl?First_Name=Tom&Last_Name=jones](#)). POST instructs the Web server to redirect the incoming data stream to the standard input of the target CGI program. It's a much more efficient method of form data transfer, since, unlike the GET method, there is no limit to the amount of data that can be sent to the CGI program. A common CGI parsing technique is to put the name/value string into a linked list or an array of structures containing name and value pairs. For example:

```
typedef struct
{
  char *name;
  char *value;
}Entry;
```

Your CGI program can then traverse the linked list or array to process each name/value pair. Numerous libraries and code fragments that perform this function are available on the Web. You can find many of them at www.yahoo.com/Computers_and_Internet/Internet/World_Wide_Web/CGI_Common_Gateway_Interface.

DEVELOPMENT TOOLS

Optima++ from Powersoft is a 32-bit compiler that combines the ease of use of a RAD 4GL environment with the power of C++. Many 4GL developers find it difficult to move

```
CREATE TABLE AddressBook (
  Address_Book_ID      INT NOT NULL,
  First_Name           VARCHAR(50) NOT NULL,
  Last_Name            VARCHAR(50) NOT NULL,
  Email_Address        VARCHAR(50),
  Phone                CHAR(15),
  Street_Address       VARCHAR(150),
  City                 VARCHAR(60),
  State                CHAR(2),
  Zip                  CHAR(9),
  Active_Ind           CHAR(1) NOT NULL DEFAULT 'Y'
                      CHECK (Active_Ind IN ('Y', 'N')),
  Create_Date          DATETIME NOT NULL DEFAULT now(),
  timestamp            TIMESTAMP NOT NULL,
  PRIMARY KEY (Address_Book_ID)
);

CREATE UNIQUE INDEX XPKAddressBook ON AddressBook (
  Address_Book_ID ASC
);
```

FIGURE 1: The Address Book table definition.

to C, C++, or Java, because the development environments for those languages are comparatively difficult to use. Developers find themselves spending most of their time trying to comprehend the compilation and link mechanisms of the IDEs, instead of focusing


```

<FORM ACTION="/cgi-bin/dbcgi.exe" METHOD=POST>

<font color="#6699ff">
<INPUT type=checkbox checked name=Check_FirstName
value=First_Name> First Name
&#160;&#160;&#160;
<INPUT type=checkbox checked name=Check_LastName
value=Last_Name> Last Name
&#160;&#160;&#160;
<INPUT type=checkbox name=Check_EMail
value=E_Mail_Address> Email
&#160;&#160;&#160;
<INPUT type=checkbox name=Check_Phone value=Phone> Phone
&#160;&#160;&#160;
<INPUT type=checkbox name=Check_StreetAddress
value=Street_Address> Street Address
&#160;&#160;&#160;
<INPUT type=checkbox name=Check_City value=City> City
&#160;&#160;&#160;
<INPUT type=checkbox name=Check_State value=State> State
&#160;&#160;&#160;
<INPUT type=checkbox name=Check_Zip value=Zip> ZIP
&#160;&#160;&#160;

<INPUT type=checkbox name=Check_Active_Ind
value=Active_Ind> Active
&#160;&#160;&#160;
<INPUT type=checkbox name=Check_CreateDate
value=Create_Date> Create Date
&#160;&#160;&#160;
<P>
<HR>
<H3><STRONG>Search Criteria:</STRONG></H3>
<font color="#6699ff"><TABLE>
<tr><td align=right>First Name: <td>
<input name=First_Name>
<td align=right>Last Name: <td>
<input name=Last_Name>
<tr><td align=right>Email: <td>
<input name=E_Mail_Address>
<tr><td align=right>City: <td><input name=City>
<td align=right>State: <td><input name=State>
<td align=right>Phone#: <td><input name=Phone>
</TABLE>
<p>

```



FIGURE 2: This is the Query Form's HTML definition.

on the languages. Learning a language as exacting as C++ is difficult enough without having to concentrate on such arcane topics as .def files and linker switches.

I chose Powersoft's Optima++ tool primarily because its database access classes are extremely well defined, and because you construct them much as you do with Powersoft's other development tool, PowerBuilder. Moreover, the database classes map to the ODBC API directly, unlike the database classes of Microsoft's or Borland's C++ development systems (Jet DAO and IDAPI, respectively), which map to intermediate object hierarchies. Additionally, Optima++ comes equipped with its own 32-bit ODBC relational database engine, SQL Anywhere (formerly Watcom SQL).

Since Optima++ generates only Win32 tar-

gets, our program requires a Web server that can run 32-bit Intel executables. The Fast-Track server for Windows 95, available from Netscape's FTP site, fills the bill and can be configured in a matter of hours.

BUILDING THE ADDRESS BOOK QUERY

An online address book will serve as a typical example of a Web database application. (You'll find all of the code for this sample project on PC Magazine Online, at www.pcmag.com.) Our sample database will contain names, addresses, and phone numbers. The software will allow you to choose which columns will be returned by a query and to search for specific records. For example, our application will support a query returning the First Name, Last Name, and Phone Number of everyone whose Last Name begins with T.

Before designing the gateway software, we must create a database and table. Since Optima++ comes with its own ODBC database server, we'll use that. For the purposes of this example, we need define only one table, Address. Figure 1 shows the syntax for the table, as defined in the SQL Anywhere database language.

Next we need to create an HTML form (see Figure 2) that will retrieve data from a browser and send it to the server database gateway. The form has two parts. The first defines which columns

will appear in the result set, and the second defines how the selection criteria, or WHERE clause, will be built. Figure 3 shows our query page.

The next phase is to design and build the database gateway software. First we instruct Optima++ that the build target must be a Win32 Console executable. That means we can use the standard character I/O libraries and objects (cin, cout) in the program. Optima++ generates all of the supporting code in addition to defining a stub main() function (see Figure 4).

CLASS DEFINITIONS

Using the Class Wizard, we create a class called CGILib (by default, all objects created in the Class Wizard inherit from the Optima++ base object Wobject), which wraps the functions necessary to parse the name/value string sent from the Web server. The CGI utility functions were downloaded from the NCSA FTP server at ftp.ncsa.uiuc.edu/web/httpd. We define the functions as static, so we won't have to instantiate an object in order to use the library functions.

Next, again using the Class Wizard, we create a class called Entry, which defines the data structure (see Figure 5) that will hold the name/value pairs created with the functions defined in CGILib.

DBGATEWAYSERVICE

The gateway functionality is encapsulated into a service class called DBGatewayService and is actually the only object that needs to be

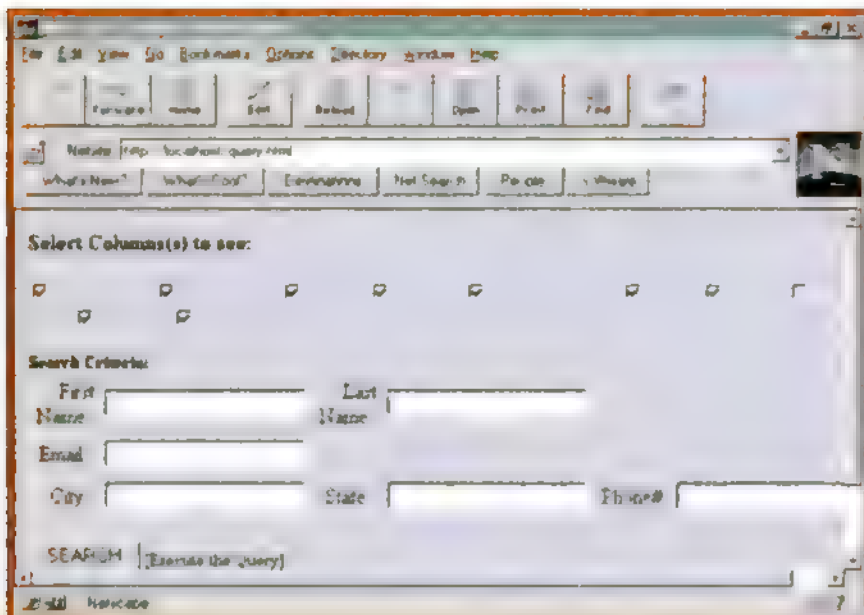


FIGURE 3: This query form is produced by the HTML code shown in Figure 2.

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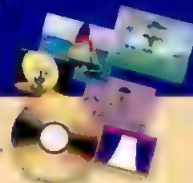
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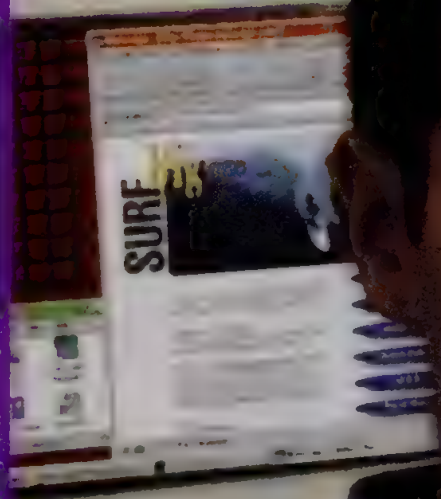
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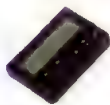
Welcome back to shore.



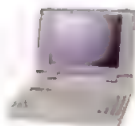
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```
WModuleHandle _ApplicationModule = NULLMODULE;  
static WApplication _Application;  
WApplication *Application = &_Application;  
  
int main( int argc, const char *argv[] )  
/*****  
*/  
{  
    int ret = -1;  
  
    if( Application->Initialize( NULL, 0, NULL, 0 ) ) {  
        // Add your code here  
  
        Application->Uninitialize();  
    }  
    return ret;  
}
```

FIGURE 4: The Win32 console main() function.

instantiated by the developer. DBGatewayService contains six member functions.

The Initialize() method sets up the service manager for later processing. Basically, that's the job of the constructor, but we don't put the code there, in order to prevent invalid Application object references, which would result if the Application->Initialize()



getenv(). GetEnvironmentVariable() returns a value of the Optima++ data type WString, allowing the use of overloaded Boolean operators. Optima++ makes extensive use of its provided string class, WString. In C, you can't use Boolean operators (==, >, and <) to compare character arrays. But C++ allows the developer to *overload* certain operators in the

(Figure 4) call were to fail and the DBGatewayService object were to be allocated on the stack. In that case, the constructor would have been called prior to the Application->Initialize() method invocation. (some other languages, such as Java, do not allow stack-based objects.)

The Initialize() method first makes sure that the REQUEST_METHOD environment variable set by the Web server is equal to POST. Note the use of the Application->GetEnvironmentVariable() instead of the familiar

scope of a class definition (for example, + for string concatenation and == for string comparison). After checking the value of REQUEST_METHOD, we initialize the content-length instance value from the CONTENT_LENGTH environment variable (POSTed data is read from the standard input file and is not followed by EOF).

The Initialize() method then attempts to create the two objects required for database access in Optima++: WTransaction and WQuery. We initialize the transaction object by setting the DataSource (ODBC source name), UserID, and Password attributes from parameters passed by the calling function. Then we create the query object and associate it with the valid transaction object, so that we can use the query object to execute SQL queries against the target database.

The LoadFormData() method takes a file pointer as its only parameter. Normally this points to stdin, but you can make it point to a disk file for debugging purposes. LoadFormData() parses the name/value pairs into the instance array of Entry objects, using the CGIlib class discussed above.

Barring any errors in the above functions, the DBGatewayService object will contain an array of Entry objects corresponding to the HTML form, as well as database-connection objects. At this point, we are ready to begin

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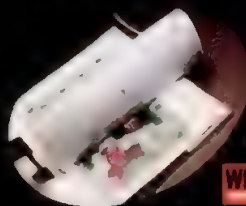
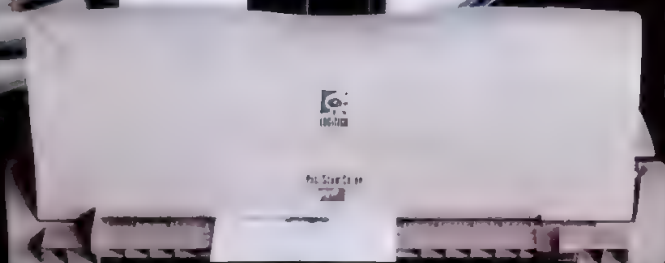
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```

const int MAXENTRIES=100;

class entry : public WObject
{
public:
    char *name;
    char *val;

private:
    // add your private instance data here
protected:
    // add your protected instance data here

public:
    entry();
public:
    ~entry();
};

// Code added here will be included at the
// top of the .CPP file
// Include definitions for resources.
#include "WRes.h"

entry::entry()
{
}

entry::~entry()
{
}

```



FIGURE 8: The Entry class.

building the SQL SELECT statement.

Remember from the above discussion of the query form that the user must choose the appropriate columns that should appear in the result set (see Figure 3). Each "checked" column will be indicated as a valid name/value pair in the array of Entry objects. We add the string Check_ to the beginning of each form-element NAME to indicate that it will be a check column. The associated VALUE element contains the table column name for the field.

The BuildSelectList method builds the SELECT list for the SQL string by looping through the Entry object array and determining whether each NAME field contains the string Check_. If it does, the associated VALUE element is appended to the current SELECT list along with a comma.

In addition to building the SELECT list, we must also give the prospective user the ability to query for specific records in the database (for example, everyone whose First Name is John). In SQL, this is accomplished with the WHERE clause, which in our example program is created in the BuildCriteriaClause() method.

Building the WHERE clause again involves looping through the Entry object array and determining what, if anything, the user has entered. If a VALUE is not a blank string and the corresponding NAME contains the string

Check_ (remember this indicates a field indicating whether the column has been checked), the code appends the NAME string, followed by "LIKE," followed by "%."

The only hurdle I encountered in Optima++ was that the Position() member function of the WString class was not implemented. (The version I used for development was the final Optima++ beta build 777.) I got around that by using the GetAnsiText() function, which returns a char *, and passing the pointer directly to the strstr() function.

At this point, the SQL command has been built and is ready to be executed on the database server. The ExecuteSQL() method adds "SELECT" to the beginning of the current QueryString instance variable. Next, the SQL command is associated with the valid instance query object by the SetSQL() method. Finally, the SQL command is executed on the server via the Open() method.

The only things left to do now are to retrieve the results from the database server and format them as an HTML table. This is done in the ProcessResults() method. First, the GetColumnCount() method is called

to determine the number of columns present in the result set. Next, we loop through each column to obtain the column name. This will use a column header for each result row (Note that columns start at 1; in Optima++ cursors, column 0 is reserved for bookmark references). Finally, in the MoveNext() method, I cursor through the result set, formatting each element as a row in an HTML table.

The only other member functions defined for the DBGatewayService class are EchoFormData(), which writes the contents of the Entry object array to the standard output, and the destructor, which deletes any dynamically allocated data.

As you can see, it's really not too difficult to build one of these database gateway programs once you know how. You can save yourself a lot of effort, however, by using one of the commercial tools mentioned earlier.

It is important, though, for today's developer to understand how the Web and its varied protocols work, and what they can do together. In the future, the standards may be Java and CORBA, but for now, they're still HTML and CGI. □

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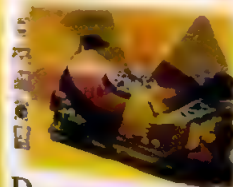
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PC Tech/Utilities

By Sheryl Canter

Utilities: A PC Tradition

The Utilities column editor picks ten favorite utilities.

This year marks the tenth anniversary of *PC Magazine's* Utilities column. We published utilities before 1987, but not consistently, and it wasn't until 1987 that the column name "Utilities" first appeared in the magazine. So it is fitting that in this special issue on utilities, we pause to look at our own contribution to this software category.

I've been a fan of the Utilities column since its inception in 1987 and have had the privilege of being the editor of the column since 1993. The Utilities column has changed quite a bit over the years. In the early days, it was mainly a demonstration of programming techniques; the usefulness of the utility was secondary. Today, both considerations carry equal weight. The column has two distinct audiences—end users who just like the utilities and don't care how they were created, and programmers looking to pick up tips and techniques. We strive to please both groups, though this isn't always easy.

THE MAKING OF A GOOD UTILITY

The hardest part of editing the Utilities column is coming up with good ideas. First, a utility must offer something useful to as many of our readers as possible. We aim for broad appeal. That's why you won't see utilities geared toward programmers or some other subgroup. At the same time, a utility must demonstrate an interesting programming technique; we need something to talk about in the article! Finally, a utility must be constrained enough in scope for a programmer/author to produce it in a reasonable amount of time. After all, we are not a commercial software company, and we don't charge you for the programs.

You'd be surprised how hard it is to come up with ideas that meet all of these requirements. Some of the ideas come from me, others come from the authors, and still others come from you, our readers, who generously post suggestions on our Web site (www.pcmag.com/discuss.htm, the Utilities discussion area) or in our Utilities area on CompuServe (GO ZNT:TIPS, Section 2—Utilities). You can also send ideas directly to me (scanter@zd.com); I'm always happy to receive them!

Here are some examples of useful utility

ideas that never got published, because they were either too hard to implement or too easy. In the too-hard category we have Modem-Lights, a utility for Windows users with internal modems that displays a graphical representation of an external modem's indicator lights and blinks them as appropriate, and NetDrive, a utility that displays an on-screen indicator when there is activity on a network drive.

My favorite too-easy utility is LongToShort (or LTOS, for short). This is a command line utility that lets you use long filenames with older applications that don't support them. It was written by *PC Magazine's* contributing technical editor, Neil J. Rubenking, to demonstrate a utility that was too easy to program to make for a good column. But since we are not running a standard Utilities column in this issue, we'll make this the column where

LongToShort finally sees the light of day.

LongToShort is a mere 61 lines of code, including comments. It takes the 16-bit program name and long filename as parameters. So if, for example, you're still using Charles Petzold's BROWSE utility (as I am), and you want to browse a file called MysteryFile, you'd type:

```
LTOS browse MysteryFile
```

LongToShort takes care of translating MysteryFile into a short filename that BROWSE can handle.

The exact syntax for LongToShort is

```
LTOS Program.exe This is a long
filename.ext
LTOS Program.exe "This is a long
filename.ext" arg1 arg2...
```



WSearch

Tom Rawson

March 26, 1996

Finds files by their names and by the text within them—a superfast search engine.



PicAlbum

Michael J. Mefford

April 9, 1996

Lets you organize and view the bitmaps on your hard disk.



Hotkey Detective

Gregory A. Wolking

June 11, 1996

Lets you view and manage your Windows 95 hotkeys.



InCtrl3

Neil J. Rubenking

July 9, 1996

Monitors installation programs and logs every change you make to your system.



ExpNotes

Neil J. Rubenking

November 5, 1996

Adds a column to Windows 95 Explorer's Details view where you can add notes.



ImgView

Jeff Prosiase

December 3, 1996

Enhances QuickView to support many more graphics formats.



COA32

Neil J. Rubenking

January 7, 1997

Automates the update of system files when you move a program to a new location.



ClipAid

Douglas Boling

February 4, 1997

Identifies URLs in the clipboard and stores them in an easily accessible list.



TrayLaunch

John Deurbrouck

February 18, 1997

Lets you launch all your desktop programs and system utilities from the tray.



FileGrab

Michael J. Mefford

March 4, 1997

Lets you copy lists of filenames from Windows 95 Explorer.

PC Magazine has published hundreds of great utilities; here are ten favorites.



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If command line arguments are added after the long filename, the long filename must be in quotation marks. Note that LongToShort will retain the long filename even if you make changes to it from within a 16-bit editor and save the file.

Of course, many utility ideas do meet all our requirements and make it into print. Over the years, *PC Magazine* has published literally hundreds of utilities. One question we occasionally get (generally from readers who have discovered an undocumented "feature") is, "Do you test these things?" Actually, yes, we do—extensively. Not only do we look for bugs, we spend a lot of time perfecting the interface and feature set. *PC Magazine* utilities have to be examples of good program design and programming techniques.

Of course, I test each utility, as does Neil Rubenking, but we don't stop there. We also have an ongoing beta test program, which is conducted in a closed section of the Programming Forum on ZDNet/CompuServe. There, volunteer testers download each utility and do their best to break it. Our testers do an excellent job of finding problems and suggesting interface improvements (if you are interested in becoming a tester, send me an e-mail message). We really do try to nail all the bugs before the utility is made available to our more than 1 million readers, but the occasional gremlin does get by. When a utility is published, we watch the online forums for reader feedback, and if a problem is detected, we fix it as soon as possible.

MY FAVORITE UTILITIES

In selecting my ten favorite utilities for this column, I first had to decide how far back to go. There are some DOS and Windows 3.1 utilities I found indispensable when I was using those platforms but no longer use now that I run Windows 95. For example, there was Michael Mefford's XpanBoss and XpanDisk, which let you change the size of a RAM disk under DOS without rebooting your computer. Or MyGroups, from Charles Edwards, which lets you nest program groups under Windows 3.1. In the end, I decided to stick to utilities that are useful today. They are presented in the order they appeared in the magazine (see the table on the first page of this article).



Some utilities are notable for their clever interface features, but what makes **WSearch** special is what you can't see—its engine. This lightning-fast and ultraflexible search utility is powered by an ingenious search algorithm. You may know the author, Tom Rawson, from some of his other work: Tom is the president of JP Software, developer of 4DOS, 4NT, 4OS2, and TakeCommand. WSearch can hunt for files by name and by the text contained within them,

and it supports regular expressions for both types of searches. So, for example, you can search for all files of the type .DOC or .XLS that contain the text strings "breach" or "broach." Versions of WSearch are available for 16-bit Windows, 32-bit Windows, and OS/2. The OS/2 version is command line only.



PicAlbum, written by Michael J. Mefford, lets you find all the bitmaps on your hard disk, view them, and organize them into picture albums. The bitmaps are not actually moved from their original locations; the albums use references to the bitmaps on your disk. The nice thing about PicAlbum—besides the handy function it performs—is its design. The interface has four panes; the two on top show the album list on the left and the list of bitmaps in the selected album on the right. The bottom two panes contain the list of directories to search on the left and the bitmaps in the selected directories on the right. To the right of each bitmap list is a thumbnail of the selected image. If you want a closer look, just double-click on the thumbnail. To move a bitmap into an album, simply drag it over to the Album Bitmap pane and drop it in. PicAlbum is a Windows 3.1 program that runs compatibly under Windows 95. It was written with the help of the ImageKnife graphics library, from Media Architects.



Windows 95 includes support for hotkeys, but Microsoft failed to include a way to manage them. Unlike Windows 3.1's Program Manager, Windows 95 Explorer does not prevent you from assigning duplicate hotkeys, and duplicates can cause strange behavior. At the same time, Windows 95 gives you no way to check for duplicates; there is no facility for viewing all assigned hotkeys. **Hotkey Detective**, written by Gregory A. Wolking, fills this gap by building a list of all the hotkeys assigned on your system so you can quickly see duplicates. The link associated with the selected hotkey is displayed on the status bar. To change an assigned hotkey—for example, to correct a problem with duplicates—select the hotkey from the list and click the Locate with Explorer button.



If you're like me, installation programs make you nervous. They can make all kinds of changes to your system, which they often don't report. If something doesn't work correctly afterward, how do you know where to look? Neil J. Rubenking's **InCtrl3** logs every change an installation program makes to your system, putting you back in control. InCtrl3, designed for Windows 95, is actually the third version we've published of this very popular utility. If you are running Windows 3.1, there is InCtrl2, an improved version of the original InCtrl (also

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for Windows 3.1). Since most people don't install new programs very frequently, Neil used a wizardlike interface that tells you what to do each step of the way. When the installation is finished, the utility's report file informs you of every change made to your system.



Longtime readers of *PC Magazine* will remember Michael J. Mefford's DirNotes, a DOS utility that lets you associate comments with your files so you can remember what's in them.

ExpNotes, written by Neil J. Rubenking, is a Windows 95 version of DirNotes. This deceptively simple-looking utility adds a column to Explorer's Details view so you can add notes or comments. The program was difficult to write, because it must access the memory space of another program—in this case, Explorer.



If you haven't used the Windows 95 Quick View facility, you ought to take a look. Right-click on a filename in Explorer, select Quick View from the context menu, and you can see what's inside the file. This is especially useful for graphics files, but few bitmap formats are supported by default. Happily, there is a Quick View API for adding support for additional formats. Jeff Prorise took advantage of this to write **ImgView**, which enhances Quick View with support for seven additional bitmap formats. The imaging capability in ImgView comes from Lead Technologies' graphics library, LeadTools Win32 Pro.



In the old days, under DOS, if you wanted to move a program from one drive partition to another, all you had to do was copy it over. But if you try that under Windows, you may discover that the program no longer works. That's because the location of a Windows program is stored in one or more system

files. To move a Windows program, you can't just copy its files to another location; you must also change the path in the system files that point to it. Neil J. Rubenking's **COA32** (Change of Address/32) lets you automate this process under 32-bit Windows. An earlier version of the utility, COA, performs the same function under 16-bit Windows. COA32 is probably not a program you are going to run frequently, so, like InCtrl3, it uses a wizardlike interface to walk you through the steps.

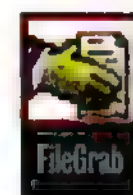


As no doubt you've noticed, the Internet is infiltrating every aspect of our lives. URLs seem to pop up everywhere these days. If someone sends you an interesting URL in a word processing document or in an e-mail message on a system not connected to the Internet, how do you save it? Chances are you jot it down on a scrap of paper. **ClipAid**, by Douglas Boling, offers a more efficient alternative. It sits in the tray and quietly monitors the Clipboard, looking for URLs. When it finds one, it adds the URL to its history list. Thus, every time you highlight a URL in any document and press Ctrl-C, the URL is automatically saved in ClipAid's history list. To access the four most recent URLs you've copied, right-click on ClipAid's tray icon and select the URL you want. ClipAid will insert the URL into your browser, launching it if necessary. To access the full history list (or to configure ClipAid), double-click on the tray icon with the left mouse button. ClipAid also lets you save URLs as shortcuts on the desktop.



With Windows 95, you can run any program in your Start menu without closing or minimizing your current application. But what about the shortcuts and system utilities on your desktop? You can copy your desktop folder to your Start menu, but that's an imperfect solution. First of all, it doesn't work as a menu; you

must open the folder and then double-click on the item you want. Second, it doesn't include system icons, such as My Computer or Recycle Bin. **TrayLaunch**, written by John Deurbrouck, gives you access to every icon on your desktop from the tray. Just right-click on TrayLaunch's icon and it's all there; you don't have to stop what you're doing to get to it.



Explorer can display lists of files on your system in all sorts of flexible ways. It offers numerous views and sort options and even has a built-in search facility. But if you want to use one of these lists in another application, you're out of luck. If you drag a file from Explorer over to a word processing document and drop it, what's inserted is the file's contents, not its name. **FileGrab**, written by Michael J. Mefford, offers a way around this. If you highlight a group of files in Explorer and drop them into the FileGrab window, you get a filename list that you can copy to the clipboard, print, or save to a file on disk. FileGrab's view options let you display just the filename or any combination of file properties, including creation date, modification date, and attributes.

Of course, the list of great utilities doesn't stop here. Some of the utilities we have in the works right now promise to be future favorites, but I can't tell you about them yet. *PC Magazine* utilities are kept confidential until they are released.

Then again, maybe one of the next great utilities will come from you. If you think you have what it takes to write a *PC Magazine* utility, send me an e-mail message and share your brainpower with over a million other PC mavens. □

Sheryl Canter is a contributing editor of PC Magazine and has been the editor of the Utilities column since 1993. You can send her e-mail at scanter@zd.com.

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TIPS AND TECHNIQUES TO INCREASE YOUR PRODUCTIVITY

User-to-User

By Neil J. Rubenking

PowerToys Update

PC MAGAZINE: Quite a few readers have responded to tips and solutions in recent columns by pointing out (correctly) that Microsoft's PowerToy utilities would handle the problems much more smoothly. The PowerToys were updated between the time those columns entered the publication pipeline and the time they were printed. The PowerToy collection is an evolving product. If you're interested in taking control of your Windows 95 installation, visit www.microsoft.com/windows/software/powertoy.htm and download the PowerToys. Most of these utilities also work under Windows NT 4.0. Note that these utilities are supplied "as is"—without support from Microsoft.

The jewel of the PowerToy collection is Tweak UI, a Control Panel applet for manipulating a system's user interface. Its latest version adds many new features, several of which solve problems that were brought up in User-to-User and Ask Our Advisors columns. For example, you can now edit the Add/Remove programs list using Tweak UI to eliminate duplicates and remove references to programs you already deleted. You can suppress the display of certain drives in Explorer, which is handy if you're currently being forced to wait while Explorer checks each of six or eight slots in a CD-ROM changer. And if you've changed your system's shell icons by editing the contents of the Registry key HKEY_LOCAL_MACHINE\SOFTWARE\Microsoft\Windows\CurrentVersion\explorer\Shell Icons, you no longer have to jump through hoops to get Explorer to recognize your changes. Just flip to Tweak UI's Repair page and click on the Rebuild Icons button.

The main purpose of Tweak UI's Repair page is to repair mysterious system problems caused by cosmic rays, gremlins, or the overenthusiastic use of RegEdit. Rebuild Icons will cause Explorer to reread the correct list of

icons used to represent such system elements as the Recycle Bin, the Control Panel, and any folder. Repair Font Folder restores the system's special handling of the folder that contains fonts, and Repair RegEdit restores the RegEdit display so all elements are visible. The Repair System Files button restores specific system files from the SYSBACKUP folder—these are files, such as COMDLG32.DLL, that errant install programs often overwrite. And Repair Associations restores the default icons and file associations for standard file types.

Some users are paranoid about the electronic "tracks" they leave in Windows 95's history lists. These lists let you rerun a program in the Run command, reload a recently used document, revisit a Web site, and so on. The lists also let anyone who has access to your system see just what you've been doing. The Paranoia

page of the Tweak UI utility, shown in Figure 1, lets you automatically blank these history lists. The checked-off lists will be cleared each time you log on to Windows; you can also press a button to clear them right away.

Tweak UI does all this and much more, but it's not the only valuable element in PowerToys. The Desktop Menu utility puts an icon on the system tray whose context menu allows you to activate any item on the desktop. Desktop Menu is similar to PC Magazine's TrayLaunch utility,

but it lacks TrayLaunch's ability to provide the entire context menu for each desktop element. The Send To utility gives the standard Send To menu a number of new choices, including one that lets you mark files in Explorer and send a list of their names to the Clipboard, and the Contents Menu utility adds a Contents menu item to the context menu for any folder; this item expands into a menu listing the contents of the folder. All these enhancements can be yours simply by downloading the PowerToys. Don't forget to check for newer versions every few months!

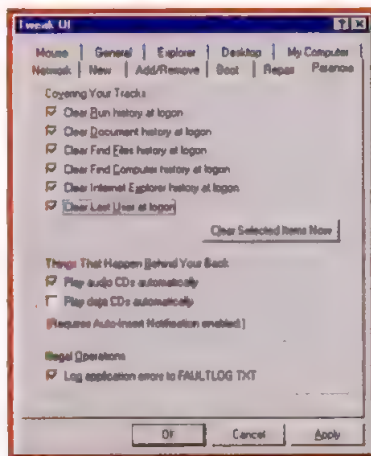


FIGURE 1: The Tweak UI PowerToy's Paranoia page lets you eliminate evidence of your recent activity.

HIGHLIGHTS



HARDWARE New memory modules may be too fast for your computer to handle. Here are some things you need to know before you upgrade. *Page 312.*



ONLINE Create a Web page that contains all of your favorite links without having to use an HTML editor. *Page 314.*



SPREADSHEETS Microsoft Excel offers no way to include graphical logos in your header, but Craig Stinson show you a workaround using the Print Titles setting. *Page 318.*

OUR ADVISORS

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PC DIRECT starts here with exciting offers from top direct vendors. See index, page 312.



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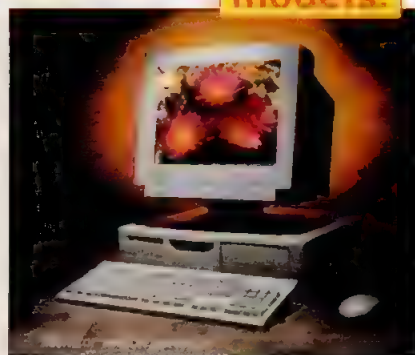
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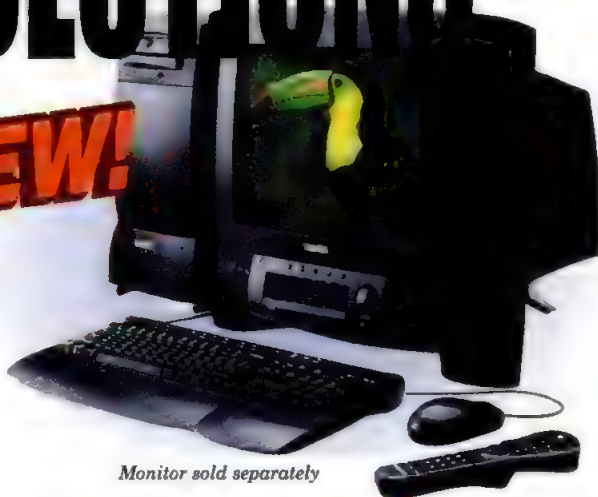
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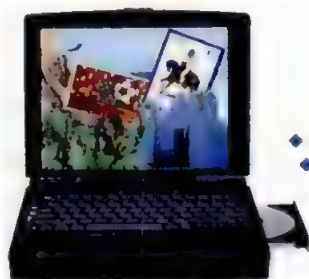
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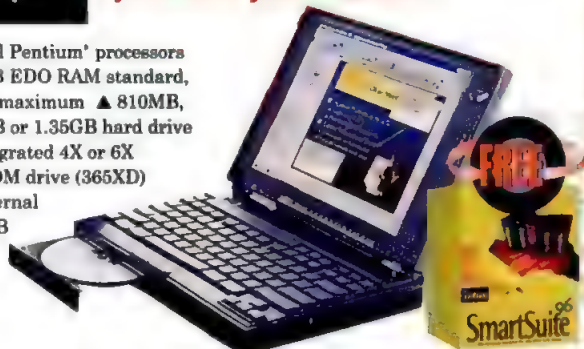
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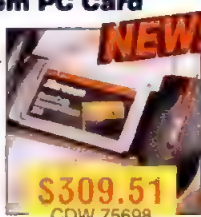
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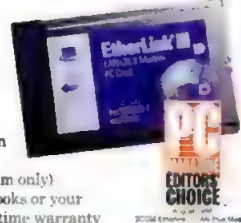
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Ask Our Advisors

HARDWARE

Too Slow for the CD-ROM Drive?

 I ran into problems when trying to install a multimedia kit including a sound card and a CD-ROM drive into an old 386DX-20 system I gave to my sister. The system has two non-IDE hard disks, 8MB of RAM, and two serial/parallel port cards, and it is running DOS 6.22 and Windows for Workgroups 3.11. The CD-ROM connects to an IDE port on the sound card.

The CD-ROM drivers installed without a problem and the CD-ROM is recognized as the E: drive on boot-up, but the system refuses to read data or audio disks in the drives. Tech support for the maker of the multimedia kit walked me through various IRQ and other options on the phone, then proclaimed that the problem was that the kit requires a 486 or better CPU to work. Is that a plausible explanation, or might it be something else?

MIKE HENRY
via ZDNet

PC MAGAZINE: I regret to say that it sounds as though the tech-support person had exhausted all the answers he or she had and was just blowing smoke in an attempt to get you off the phone. It certainly doesn't seem reasonable that a product would work with a 486 but not a 386 CPU. (After all, many of the 486 clone chips are still 386 instruction-set chips.) This still leaves the question of what else might be the problem.

One possibility is that your non-IDE controller (most likely MFM or ESDI) is conflicting with the sound card; the IDE portion is one candidate. For about \$10, you should be able to buy an IDE paddle card with lots of different configuration options. Disable the sound-card port, then see if you can get the paddle-card connection to work. (If you happen to have an old IDE drive handy, try taking out the non-IDE controller and see if the CD-ROM will work when you boot from the IDE drive.)

The other possibility is that something is wrong with the CD-ROM drive itself. If the drive is recognized by the driver on boot-up, then it is likely there's no conflict at all. Instead, the drive may be broken and need to

be serviced or replaced. If possible, try installing the drive in a different system with a working IDE hard disk; if the CD-ROM drive doesn't work there, then it becomes the leading suspect.—*Alfred Poor*

Memory's Too Fast?

I have an old 486DX-33 on which I'm trying to operate Windows 95. I recently replaced the original 8MB (eight 1-by-9 80-nanosecond 30-pin chips) of DRAM with 16MB (four 4-by-9 70-ns 30-pin chips). The power-on self-test recognizes the new chips, but Windows 95 doesn't and faults out. The system reported that HIMEM.SYS had detected unreliable XMS memory, and then it refused to load the XMS driver or Windows.

I swapped the order of the SIMMs; I took them back and got another set; I searched my board for DIP and jumper switches; nothing worked. Finally, I entered the CMOS configuration utility and disabled my 256K external cache. Now the system seems to work fine—except that I can't enable the external cache. Do you have any ideas on what my problem might be, and whether there's a way to enable the cache?

JERONE J. ENGLISH
Hermosa Beach, California

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PC MAGAZINE: Since you've already replaced the SIMMs once, it's unlikely the problem is caused by a bad module. Instead, I suspect that the new memory is out of your motherboard's specified range.

DRAM speed ratings are often misunderstood. Some people think you can improve system performance by installing memory that is rated faster than the memory you currently have. Faster memory may work, but it won't result in any speed increase.

The speed rating of a memory chip refers to how fast the memory can be accessed. If you put in memory that is slower than specified for your system, you will get errors (or the system will lock up), because the memory cannot respond quickly enough to requests from the CPU. If you put in memory that is slightly faster than what's specified for the system, it may work without a problem, because the memory is able to respond faster than the CPU requests (though you are wasting money on faster memory, because slower memory would work just as well).

If the memory is too fast, however, you may run into problems because it is not being refreshed frequently enough. In this case, the original 80-ns RAM was replaced with 70-ns RAM. If the motherboard isn't able to get to the memory fast enough, the result could be memory problems like the ones experienced by this reader. Disabling the system cache could speed up memory access enough for the problems to be eliminated (because no time is wasted looking in the cache first). Some motherboards appear to be more sensitive to variations in memory speed ratings than others.

My suggestion for your next step is to try a set of 80-ns SIMMs in place of the faster modules, and see if that resolves the problem. For best results, when buying memory upgrades always be careful to match the memory as closely as possible with the modules you are replacing.—*Alfred Poor*

OPERATING ENVIRONMENTS

Controlling Explorer's Initial Display



When I open Explorer in Windows 95, its default view shows the following: In the left panel, the C: drive with the folders expanded, and on the right side, the same view. I invariably double-click on the C: drive icon on the left to collapse the tree view so I can see my A:, D:, and other network drives. When I do so, Explorer shows my C: drive's folder on the left and displays the rest of my available drives on the right. How can I make Explorer default to this display to start with?

STEPHEN L. LANGE
via the Internet

PC MAGAZINE: You can definitely control the initial display in Explorer. For the purpose of experimentation, open a DOS box. If you just run the command EXPLORER, you get the display described above, with the C: drive expanded. Now close Explorer and enter

```
EXPLORER /E,/SELECT,C:\
```

This is the display you requested. Explorer comes up, all drives are shown, but none are expanded.

Here's how to fix your Start menu so that Explorer comes up the way you want. Right-click the Start button and choose Explore. Locate the entry for Windows Explorer (normally found in the Programs folder). Right-click the entry for Windows Explorer and select Properties from the menu. Click the Shortcut tab, then change the switches after the command name in the Target box to /E,/SELECT,C:\. Click OK. Now each time Explorer starts, the left pane will show all drives; the C: drive will not be expanded.

—*Neil J. Rubenking*

Connecting Two Computers

I use two computers in my home, both running Windows 95. They are separated by about 12 feet. I'd like to join them together so I can use them as one. What is the simplest and most economical way to do this?

DONALD M. CALLAHAN
El Paso, Texas

How do you connect two Windows 3.1 computers? Can you do it through a parallel cable?

ANANTHAN THANGAVEL
Los Angeles, California

PC MAGAZINE: Under Windows 95, you can give two computers access to each other's files using the Direct Cable Connection accessory. Chances are good, however, that this accessory was not installed with your original Windows 95 setup. If you don't find it in the Accessories menu, you'll need to choose the Control Panel Add/Remove Programs applet, click the Windows Setup tab, select Communications, press the Details button, and check Direct Cable Connection. You'll also need Dial-Up Networking, so make sure that's checked as well.

When you've got the necessary accessories installed on both systems, connect them via a null-modem serial cable or a parallel cable. Then run the DCC applet on each, deciding which will be the "host" and which will be the "guest" this first time. The guest computer will gain access to the host computer's files. You can of course disconnect and reverse the roles at any time.

Under Windows 3.1, the DOS program InterLink (INTERLNK) will provide the connection, using either a null-modem cable or a parallel cable. InterLink was introduced with DOS 6.0, and DOS help explains how to set up the connection. Just establish an InterLink connection before starting Windows. In some ways, the InterLink connection is more complete than that provided by the Windows 95 Direct Cable Connection. Under DCC, the remote computer's drives are visible in their own separate Explorer-like Window, but not in Explorer itself or in other applications. Under InterLink, the remote computer's drives can be treated just as if they were new drives installed in the local computer.

—*Neil J. Rubenking*

ONLINE

Put Favorite Links in An HTML Document



I'd like to be able to take all the hyperlinks in my Microsoft Internet Explorer Favorites folder, create an HTML page with them, then set that as my start page. This way I'd have instant access to all my favorite sites without having to bother with drop-down menus, especially the ones that get full and won't display all the links contained in them. Whenever I want to access the links, all I'd have to do is to hit the Home button. Are there any easy ways to do this without having to study HTML programming?

TRACY ECKELS
via the Internet

PC MAGAZINE: Yes, you can do this without learning HTML. Using Internet Mail, write yourself a message, making sure Format is set to HTML. Include in this message all the links you want and any formatting you'd like. Then send the message.

Now right-click the received message in your in-box and select Properties. Click on the Details tab and then on the Message Source button. Scroll down until you see the line

```
Content-Transfer-Encoding: quoted-printable
```

Highlight everything after that line, up to but not including the line

```
----- =_NextPart_000_01BBA597.BB47A4E0
```

Press Ctrl-C to copy the selected text to the Clipboard, then launch WordPad and press Ctrl-V to paste the text. Save the result as a plain text file with an .HTM extension. (To make the page look better, search for occurrences of "=3D" and replace each with a plain "=".)

Load the HTML page thus created into

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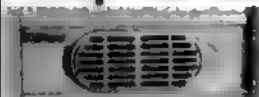
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Plextor	12X	PX12CS	105ms	\$309	\$399
Toshiba	12X	XM5701B	115ms	\$180	\$270
NEC	12/16X	CDR1610	100ms	\$199	\$289
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ATAPI IDE

Brand	Spin	Model	Speed	Int	Ext
Mitsumi	8X	CRMCFX800	150ms	\$110	\$140
Cyber	12X	CYBER12X	150ms	\$115	\$145
Lite On	12X	LTN126A	155ms	\$119	\$149
Acer	12X	AC612A	125ms	\$135	\$165
Toshiba	12X	XM5702B	115ms	\$145	\$175
Teac	12X	CD512E	160ms	\$145	\$175
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2110MB	10.5ms	4500	Quantum	TM32110S	3	\$319	\$389
2150MB	9ms	5400	Seagate	ST32155N	5	\$475	\$545
2150MB	8ms	7200	Seagate	ST32171N	5	\$649	\$719
2151MB	10ms	5400	Quantum	FB32160S	3	\$339	\$409
3228MB	10ms	5400	Quantum	FB33240S	3	\$399	\$469
3254MB	10.5ms	4500	Quantum	TM33200S	3	\$369	\$439
4100MB	7.9ms	7200	Micropolis	MC4341	5	\$739	\$809
4310MB	10ms	5400	Quantum	FB34320S	3	\$479	\$549
4350MB	8ms	7200	Seagate	ST34371N	5	\$1039	\$1109
4400MB	8ms	7200	Fujitsu	M2954S	5	\$819	\$889
4550MB	8ms	7200	Quantum	XP34550S	5	\$939	\$1009
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6448MB	10ms	5400	Quantum	FB36480S	3	\$599	\$669
9091MB	8.5ms	7200	Micropolis	MC3391	5	\$1529	\$1599
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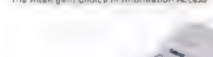
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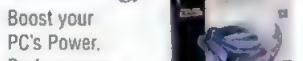
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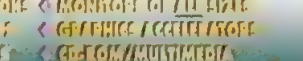
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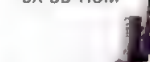


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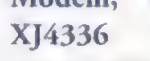


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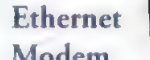
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your browser and set it as your default start page. That's all there is to it. As requested, whenever you start the browser, your home page has all your favorites on it. And whenever you need to get back to it, just hit the Home button.—Neil J. Rubenking

WORD PROCESSING

Changing Paired Codes In WordPerfect for Windows, Revisited



The August 1996 Solutions column presented a tip for changing paired codes in WordPerfect 6.1 for Windows. Figure 1 shows a macro that provides an alternative solution for both WordPerfect 6.1 for Windows and WordPerfect for Windows 95, Version 7. The macro takes advantage of the Find and Replace command's Extend Selection option, which lets you select text between the current cursor position and the next found target.

The part of this macro that replaces the codes lies between the commands Label (Top) and Go (Top). The macro searches for the [Italc On] code, then turns on the Extend Selection option with the MatchExtendSelection() command, and searches for the next [Italc Off] code. Once the text is selected, the macro toggles the Underline attribute on for the selection and toggles the Italic attribute off. The Go (Top) command sends the macro back to the Label (Top) line to repeat the process. The OnNotFound (EndIt) command before the Label (Top) command tells the macro to jump to the label EndIt when no more [Italc On] codes can be found.

DAWN NORMAN
via the Internet

```
OnNotFound(EndIt)
PosDocVeryTop
```

```
Label (Top)
SearchString ("[Italc On]")
MatchPositionAfter ( )
SearchNext (Extended!)
MatchExtendSelection ( )
SearchString ("[Italc Off]")
SearchNext (Regular!)
AttributeAppearanceToggle
(Underline!;Italics!)
Go (Top)
```

```
Label (EndIt)
Quit
```



FIGURE 1: This macro for WordPerfect 6.1 for Windows or WordPerfect for Windows 95, Version 7, will replace italics with underlining.

PC MAGAZINE: Several readers sent in variations on this macro as improvements to the original approach. As a macro, this does indeed require far fewer lines. But before we get to the macro, note that this is not a useful approach for replacing paired codes manually—the problem the original solution addressed.

This macro requires just two search commands and only one pass through the document. If you weren't using a macro, however, you would have to repeat each of the steps for every italicized word or phrase. The earlier technique used five replace commands—two to add arbitrary marker characters next to the [Italc On] and [Italc Off] codes, two to replace the markers with [Und On] and [Und Off] codes, and one to delete all of the codes for italics. But these five steps are all you need, no matter how many italicized words or phrases are in the file.

Note, too, that the fact that this approach relies on a simpler, shorter macro doesn't necessarily mean it's the preferred choice. In my tests on a two-page file with 130 italicized phrases, a macro based on the techniques given in last August's column took about 6 seconds to replace the italics with underlines in both WordPerfect 6.1 for Windows and WordPerfect for Windows 95, Version 7. In contrast, the macro in Figure 1 took roughly 22 seconds in WordPerfect 6.1 and well over a minute in WordPerfect 7. (You can download Figure 1 from PC Magazine Online as IT2UND.WCM. See the sidebar "Getting the Files" in this issue's Utilities column for downloading instructions.)

The less elegant macro was faster in this case, presumably because it needed only 5 replace commands rather than 260 search commands. When I reformatted the file to include only five italicized phrases, the time for both macros dropped to about 2 seconds.

The one advantage Ms. Norman's macro has under any conditions is that it doesn't add arbitrary characters as markers at any point. This means you don't have to worry about whether you've used the markers as text characters elsewhere in your document. For many users, that's enough to recommend the shorter macro even though it will often be slower.

Note that Figure 1 includes a PosDocVeryTop command, which I added to force the macro to start searching at the very beginning of the document, before any codes. The macro Ms. Norman submitted sets the search mode to Extended in the first SearchNext command. This is intended to tell the macro to search through the entire document, including, for example, headers. But without the PosDocVeryTop command, the macro will skip the header unless you place the cursor in the header manually before you run the macro.—M. David Stone

SPREADSHEETS

Logos in Excel Headers And Footers



How do I add a graphic logo to the header or footer of a Microsoft Excel document? It's easy in Word, but Excel uses a different mechanism, and I haven't found a way to do it, even in VBA.

KEN COLLINS
Newmarket, Ontario, Canada

PC MAGAZINE: It's true, you can't paste graphical information into an Excel header or footer. The header and footer dialogs accept nothing but text. But Excel's Print Titles setting should solve at least half—the header half—of your problem. Print Titles lets you repeat a designated set of rows at the top of every printed page (or a designated set of columns at the left side of every page). Anything that you put in those rows, including graphics, will appear on each page.

To get to the Print Titles setting, choose Page Setup from the File menu and click the Sheet Tab. Go to the Rows to Repeat at Top edit box and either point to or type in the appropriate row numbers. To specify rows 1 through 9, for example, you could type in \$1:\$9.

You can combine print titles with ordinary headers, and if you specify a small enough top margin setting, you can get the titles and header to overlap. To change the top margin setting, just go to the Margins tab of the Page Setup dialog.

Unfortunately, there's no way to repeat an image automatically at the bottom of each page.—Craig Stinson

DATABASES

Squeezing Five Lines Onto 1-Inch Labels



How can I produce a simple 1-inch mailing label consisting of five lines of 10- or 12-point type at six lines per inch in Microsoft Access for Windows 95? This is "your basic label" in the recommended U.S. Postal Service specifications, but Access seems unable to produce it. If you use the Label Wizard to create the label, it allows only about three lines of 12-point text on a 1-inch label. You have to reduce the text to about 8-point type to get five lines on a label. If you go into design view and laboriously set the lines to .1667 inches (6 lpi), set the "Can Grow" property to "No" (so it doesn't override the spacing), and set the type size to 12, you get a blank sheet for your pains. We are in the final throes of con-

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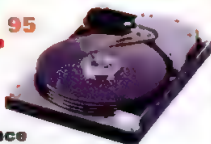
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PM047


```
' Function LabelBlock - Supply row source for 1" labels
*****
Public Function LabelBlock(Company, Contact, Address1,
Address2, City, Region, PostalCode) As String
Dim L1 As String, L2 As String, L3 As String, L4 As
String, L5 As String, Cr As String
Cr = Chr(13) & Chr(10) ' Carriage return and line feed

' Form first line of label
L1 = IIf(Isb(Company), "", Company & Cr)

' Form second line of label
L2 = IIf(Isb(Contact), "", Contact & Cr)

' Form third line of label
L3 = IIf(Isb(Address1), "", Address1 & Cr)

' Form fourth line of label
L4 = IIf(Isb(Address2), "", Address2 & Cr)
```

```
' Form fifth line of label
L5 = City & IIf(Isb(Region), " ", " " & Region & " ") &
PostalCode

' Concatenate to fill the textbox
LabelBlock = L1 & L2 & L3 & L4 & L5
End Function

*****
' Function Isb(V as Variant) -
' Return True if Variant is a
' Null or a zero length string
*****
Public Function Isb(V As Variant) As Boolean
If IsNull(V) Or V = "" Then Isb = True Else Isb = False
End Function
```

FIGURE 2: Call the LabelBlock code shown here from the Control source property of the label textbox in your Microsoft Access label report, as shown in Figure 3, to squeeze five lines of 10-point text on a 1-inch label.

verting several large databases to Access and have unexpectedly hit a brick wall.

I have been through several iterations with Microsoft via its newsgroup, and it hasn't been able to offer a solution. The company's last observation was that Access will not display the type if the space is not large enough. This

ently decided that a label report using five lines of 10-point type on each 1-inch label exceeds one of these limits. I tried this and couldn't find a way to get five lines of 10-point text correctly formatted on a sheet of 1-inch labels using only the Access Label Wizard or Report Designer. But this is less likely a bug and more likely a by-design limitation.

After some research and experimentation, however, I came up with the technique shown in Figure 2 and Figure 3, which should work for you. It's derived from a solution to a different problem that I came across on the Microsoft Developer Network CD.

To use this technique, you create your label report using the Label Wizard as you normally would. Then delete all but the topmost text box on the label design and modify the text box so that it looks like the one shown in Figure 3. Change the Control Source property to

```
=LabelBlock([CompanyName],
[ContactName],
[Address1],[Address2],[City],[Region],
[PostalCode])
```

Then change the Top property to .01 inches and the Height property to 1 inch. Next, select the View menu, choose Code, and add the functions shown in Figure 2. (To add a function, select the Insert menu and choose Procedure.)

The purpose of the LabelBlock function is to concatenate the fields required for each

label while inserting carriage-return/line-feed pairs where appropriate. It also closes up any blank spaces for labels where a value is missing (an entry with no company name, for example). The result is then returned to the text box on the label as one long string. When Access formats this text on the report, it does so with less space between the lines than it would if each line were in a separate text box. As a result, you can get five lines of 10-point type (I used Arial) on a standard 1- by 4-inch label.

You'll have to change the code and the call to the LabelBlock function to substitute your own column names. You can download the code shown here from PC Magazine Online. —Sal Ricciardi

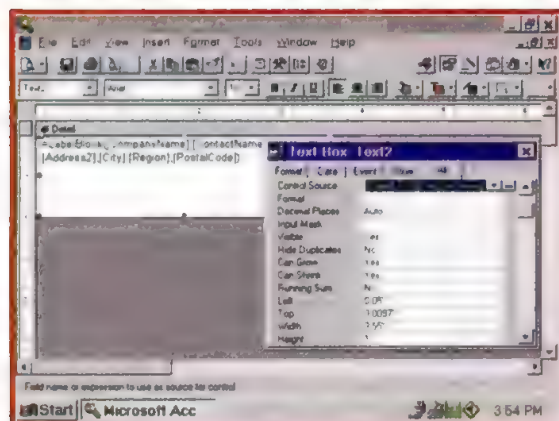


FIGURE 3: Create a text box like the one shown here, then use the code shown in Figure 2 to get five lines of 10-point text on a standard 1-inch label.

would suggest that there is a bug in Access that incorrectly calculates the amount of space a type size requires, since .1667 inches is the standard spacing for 12-point type. We haven't started working with other reports yet, but if this is a general bug in Access, it must make it very difficult to lay out reports with anything approaching normal spacing between lines.

RICHARD S. BROUGHTON
Durham, North Carolina

PC MAGAZINE: Normally, blank pages are the result of a report design that exceeds the total page size and width. So Access appar-

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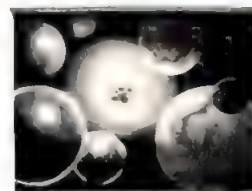
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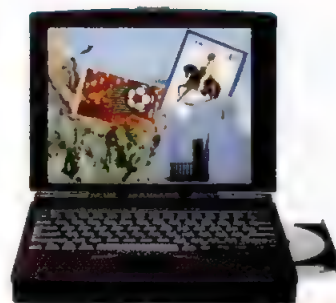
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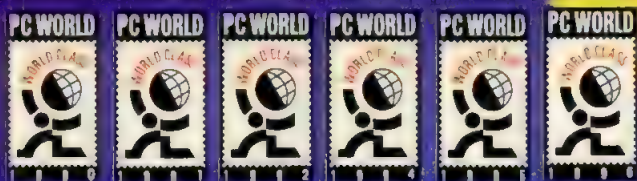
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Model	CPU	Screen	RAM/HD	CD	Price
520T	120MHz	11.3" Dual Scan	8/810MB	6X	\$1799
520T	120MHz	11.3" Active	8/810MB	6X	2499
530T	133MHz	11.3" Active	16MB/1.3GB	6X	2999*
555T	150MHz	11.3" Active	16MB/1.3GB	6X	3999*

* Includes built-in 28.8 fax modem



LifeBook™ 500 Notebook

LifeBook™ 600 Notebook

- 133MHz Pentium processors
- Only 1.2" thick and 4.2 lbs
- 12.1" Active Matrix displays
- Integrated 28.8 fax modem

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Model	CPU	Screen	RAM/HD	CD	Price
635T	133MHz	12.1" Active	16MB/1.3GB	Opt.	\$3999
635T	133MHz	12.1" Active	16MB/1.3GB	Opt.	3999*

* Includes Windows for Workgroups or Windows 95



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- Built-in SoundBlaster Pro compatible audio

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Model	CPU	Screen	RAM/HD	CD	Price
420CDS	100MHz	11.3" Dual Scan	8/772MB	6X	\$1679
430CDS	120MHz	11.3" Dual Scan	16MB/1.2GB	10X	1969
420CDT	100MHz	11.3" Active	8MB/1.2GB	6X	2449
430CDT	120MHz	11.3" Active	16MB/1.2GB	10X	2699



Satellite Pro 430



Tecra 510

Tecra 500 & 510

- 120 & 133MHz processors
- Up to 10X CD-ROM drives on selected models
- 16MB EDO RAM memory
- 12.1" Super VGA displays

Tecra 500CS
\$1799
3-Year TAP Warranty... \$99.97
5-Year TAP Warranty... \$299.97

Model	CPU	Screen	RAM/HD	CD	Price
500CS	120MHz	12.1" Dual Scan	16MB/1.3GB	Opt.	\$1799
500CDT	120MHz	12.1" Active	16MB/1.3GB	6X	3449
510CDT	133MHz	12.1" Active	16MB/2.1GB	10X	4279

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HiNote VP 520
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5-Year TAP Warranty... \$349.97

Model	CPU	Screen	RAM/HD	CD	Price
VP 520	120MHz	11.3" Dual Scan	8MB/1.08GB	6X	\$2449
VP 525	120MHz	11.3" Active	8MB/1.08GB	6X	2949
VP 535	133MHz	12.1" Active	8MB/1.44GB	6X	3599
VP 545	150MHz MMX	12.1" Active	8MB/1.44GB	6X	3899



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Model	CPU	Screen	RAM/HD	CD	Price
Ultra II	133MHz	11.3" Active	16MB/1.35GB	Opt.	\$4499
Ultra II	150MHz	11.3" Active	16MB/1.44G	Opt.	4799*
Ultra II	133MHz	11.3" Active	16MB/1.35GB	Opt.	4699**
Ultra II	150MHz	11.3" Active	16MB/1.44G	Opt.	4799

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Model	CPU	Screen	RAM/HD	CD	Price
1070	133MHz	12.1" Dual Scan	16MB/1.1GB	10X	\$2899
1080	166MHz MMX	12.1" Active	16MB/1.44GB	10X	4299



Presario

LTE 5000

Model	CPU	Screen	RAM/HD	CD	Price
5250	120MHz	10.4" Active	16/810MB	Opt.	\$3099
5280	120MHz	11.3" Active	16MB/1.35GB	Opt.	3859
5300	133MHz	12.1" Active	16MB/1.35GB	Opt.	4349
5380	133MHz	12.1" Active	16MB/2.2GB	Opt.	4949
5400	150MHz	12.1" Active	32MB/2.2GB	Opt.	5139

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5-Year TAP Warranty... \$349.97

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MX133T	133MHz	12.1" Active	16MB/1.35GB	8X	3999
MMX166T	166MHz	12.1" Active	16MB/2.1GB	8X	\$1999

M1000
\$1999
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Mx Series
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NEC

6200MX

Model	CPU	Screen	RAM/HD	CD	Price
6200MX	166MHz	MMX 13.3" Active	32MB/2.1GB	10X	\$6399

6050

Model	CPU	Screen	RAM/HD	CD	Price
6050H	150MHz	MMX 12.1" Active	16MB/1.4GB	10X	\$4699
6050MX	150MHz	MMX 12.1" Active	16MB/2.1GB	10X	\$1999

Versa 6200MX
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5-Year TAP Warranty... \$799.97

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Versa 6200



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Ascentia A & P

Model	CPU	Screen	RAM/HD	CD	Price
A41	120MHz	11.3" Dual Scan	16MB/1.0GB	6X	\$1999
A42	120MHz	12.1" Active	16MB/1.0GB	6X	2499
P50	133MHz	12.1" Active	24MB/1.0GB	6X	3649*
P50	133MHz	12.1" Active	24MB/2.1GB	6X	4099*

* Features 28.8 fax modem

Ascentia J

Model	CPU	Screen	RAM/HD	CD	Price
J55	133MHz	11.3" Active	16MB/1.0GB	Opt.	\$2299

Ascentia A41
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Ascentia A

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Model	CPU	Screen	RAM/HD	CD	Price
W100D	133MHz	11.2" Wide Dual Scan	16MB/1.1GB	Opt.	\$2799
W100T	133MHz	11.2" SHA Wide Active	16MB/1.1GB	Opt.	3299

9300

Model	CPU	Screen	RAM/HD	CD	Price
9300	150MHz	12.1" Dual Scan	16MB/1.4GB	10X	\$2699
9300T	150MHz	11.3" Active "SHA"	16MB/1.4GB	10X	3199

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Echos

Model	CPU	Screen	RAM/HD	CD	Price
Echos	100MHz	11.3" Dual Scan	8MB/1.3GB	6X	\$1624*
Echos	100MHz	10.4" Active	8MB/1.3GB	6X	1899*
Pro	133MHz	12.1" Dual Scan	16MB/1.3GB	8X	2999
Pro	133MHz	12.1" Active	16MB/2GB	8X	3499
Pro	150MHz	12.1" Active	16MB/2GB	8X	3999

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HP OmniBook
800 Notebook PC

HP OmniBook 800

Model	CPU	Screen	RAM/HD	CD	Price
800CS	100MHz	10.0" Dual Scan	16/810MB	Opt.	\$2449
800CT	133MHz	10.4" Active	16MB/1.4GB	Opt.	3469

HP OmniBook 5500

Model	CPU	Screen	RAM/HD	CD	Price
5500CTS	120MHz	10.4" Active	16MB/1.35GB	Opt.	\$2749
5500CTS	133MHz	12.1" Active	16MB/1.35GB	Opt.	3279
5500CTS	133MHz	12.1" Active	16MB/2GB	Opt.	3549

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Model	CPU	Screen	RAM/HD	CD	Price
660CD	166MHz	MMX 12.1" Dual Scan	16MB/1.35GB	10X	\$3249
660CDT	166MHz	MMX 11.3" Active	16MB/2.1GB	10X	3949

TravelMate 6000

Model	CPU	Screen	RAM/HD	CD	Price
6030	133MHz	12.1" Active	16MB/1.35GB	6X	\$3399
6050	150MHz	12.1" Active	16MB/1.35GB	6X	3699
6160	166MHz	MMX 12.1" Active	32MB/2.1GB	10X	4899

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7160	166MHz	16MB/2.1GB	8X	1569
7200	200MHz	16MB/3.0GB	8X	2099

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Infinia	15"	13.7"	1280 x 1024	\$459
Infinia	17"	16.2"	1280 x 1024	759

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4770	200MHz MMX	32MB/3.8GB	16X	2299

Presario Monitors

Model	Size	View	Resolution	Price
Presario	14"	12.9"	1024 x 768	\$399
Presario	15"	13.5"	1024 x 768	479
Presario	17"	15.6"	1280 x 1024	749



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S64	166MHz	16MB/2.5GB	8X	\$1599
S76	200MHz	32MB/2.5GB	8X	1999
S66	166MHz	16MB/3.2GB	8X	2169*
S80	166MHz MMX	32MB/3.2GB	8X	2199*
S90	200MHz MMX	32MB/3.2GB	8X	2399*

* Cordless mouse and joystick included

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- 16MB or 32MB EDO RAM memory
- 3D stereo audio and graphics

Model	CPU	RAM/HD	CD	Price
7320	166MHz MMX	16MB/2.1GB	16X	\$1799
7360	200MHz MMX	32MB/3.8GB	16X	2299*

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Model	Size	View	Resolution	Price
Pavilion	15"	13.8"	1024 x 768	\$449
Pavilion	17"	15.7"	1024 x 768	749

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9320	200MHz MMX	24MB/1.6GB	8X	1899
9402	166MHz MMX	32MB/2.0GB	16X	1899
9404	200MHz MMX	32MB/3.0GB	16X	2179
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VAIO	166MHz MMX	32MB/2.5GB	16X	\$1999
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Model	Size	View	Resolution	Price
VAIO	15"	13.9"	1280 x 1024	\$579

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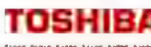
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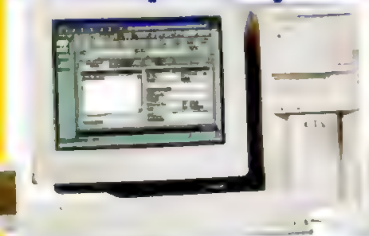
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AST	Ascentia	P 50	P133	1.0GB	24MB	6x	12.1" SVGA TFT	38803	\$3,579.00
Compaq	Presario	1060	P120	1.0GB	16MB	6x	12.1" SVGA DS	39685	\$2,399.00
Compaq	Presario	1070	P133	1.0GB	16MB	10x	12.1" SVGA DS	39696	\$2,899.00
Compaq	Presario	1080	MMX166	1.4GB	16MB	10x	12.1" SVGA TFT	39697	\$4,499.00
Hitachi	E Series	E133DN	P133	1.0GB	16MB	Opt	11.3" SVGA DS	39690	\$1,799.00
Hitachi	E Series	E133T	P133	810MB	16MB	Opt	11.3" SVGA TFT	34193	\$2,399.00
Hitachi	M Series	M134T	P133	1.0GB	16MB	6x	12.1" SVGA TFT	42948	\$3,499.00
Hitachi	Mx Series	Mx150T	P150	1.35GB	16MB	8x	12.1" SVGA TFT	39681	\$4,799.00
Hitachi	Mx Series	Mx166T	MMX166	2.0GB	16MB	8x	12.1" SVGA DS	39699	\$5,199.00
IBM	ThinkPad	365X	P120	810MB	8MB	Opt	10.4" SVGA TFT	36732	\$1,899.00
IBM	ThinkPad	365XD	P120	810MB	8MB	4x	10.4" SVGA TFT	36733	\$1,999.00
IBM	ThinkPad	365X	P133	1.08GB	8MB*	Opt	11.3" SVGA DS	36734	\$1,949.00
IBM	ThinkPad	365XD	P133	1.35GB	8MB	4x	11.3" SVGA TFT	36735	\$2,999.00
IBM	ThinkPad	760EL	P133	1.08GB	16MB	Opt	12.1" SVGA TFT	33185	\$4,399.00
IBM	ThinkPad	760ED	P133	2.1GB	16MB	6x	12.1" XGA TFT	36737	\$5,999.00
IBM	ThinkPad	760E	P150	2.1GB	16MB	Opt	12.1" XGA TFT	36738	\$5,999.00
NEC	Versa	2400CD	P100	1.0GB	8MB	6x	11.3" SVGA DS	36990	\$2,199.00
NEC	Versa	6000H	P100	1.0GB	16MB	6x	11.3" SVGA TFT	34171	\$3,499.00
NEC	Versa	6030X	P133	1.44GB	16MB	6x	12.1" XGA TFT	34173	\$3,999.00
Olivetti	Echos	P100C	P100	1.3GB	8MB	6x	11.3" SVGA DS	37708	\$1,699.00
Olivetti	Echos	P120E	P120	1.3GB	8MB	6x	11.3" SVGA TFT	37710	\$2,299.00
Olivetti	Echos	P133S	P133	1.3GB	16MB	6x	11.8" SVGA TFT	37711	\$2,699.00
Olivetti	Echos Pro	150S	P150	2.1GB	16MB	8x	12.1" SVGA TFT	39684	\$3,999.00
TI	Extensa	600CD	P120	810MB	8MB	6x	12.1" SVGA DS	38759	\$1,899.00
TI	Extensa	650CD	P133	1.35GB	16MB	10x	12.1" SVGA DS	38760	\$2,379.00
TI	Extensa	900	P133	1.35GB	16MB	Opt	12.1" SVGA DS	38842	\$4,399.00
TI	Extensa	900CDT	P133	1.35GB	16MB	8x	11.3" SVGA TFT	38844	\$4,099.00
Toshiba	Satellite	110CS	P100	810MB	8MB	Opt	11.3" SVGA DS	34857	\$1,279.00
Toshiba	Satellite Pro	420CDT	P100	810MB	8MB	6x	11.3" SVGA TFT	34860	\$2,479.00
Toshiba	Tecra	500CS	P120	1.26GB	16MB	Opt	12.1" SVGA DS	34862	\$1,799.00
Toshiba	Portege	650CT	P133	1.2GB	16MB	Opt	11.3" SVGA TFT	34861	\$3,649.00
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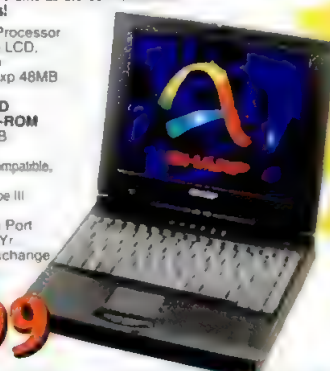
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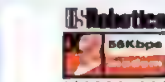
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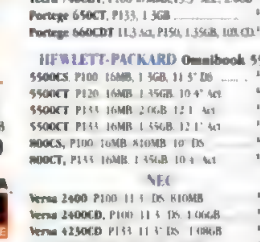
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Courier 28.8 PC Card w/cable CR001015	Accura 33.6 External Internet Solution ISM-02754
SIMPLE TECHNOLOGIES PC CARD	PRACTICAL PERIPHERALS ISA BUS
28.8 SimpleJack 14.4 Fax NT/AT/288K	V.34 28.8 Data/Fax Internet PM2000/INET
HAYES PC CARD	V.34 28.8 Data/Fax Internet PM2000/INET
Optima 33.6 EZJack SmartCom HAY-02690	US Robotics ISA BUS
PRACTICAL PERIPHERALS PC CARD	Sportster 28.8 Software SP-000840
Practical Internal 33.6 Internet for PC/MAC/INET	Sportster 28.8 Internet Software SP-000840
Practical Internal 33.6 Internet for PC/MAC/INET	Sportster WINMODEM Win 95 SP-001125
CONNECTWARE PC CARD	Sportster Voice 28.8 SP-001171
PhoneWorks 33.6 To Go Cable PBT060436	Sportster Voice Ext. V.34, 28.8, 33.6 SP-001172
PhoneWorks ISDN To Go PC/MAC/PLIN	CORNER EVERYTHING CORN1223
Office Communicator 28.8 D1-RE24SPAL	CORNER EVERYTHING CORN1224
SoundExpression 28.8 D1-RE34SBS	

Printers...Laser/Ink Jet/Dot Matrix

HP PRINTERS	OKIDATA PRINTERS
DeskJet 540 Printer	OKiPage 4W (Windows Only)
DeskJet 400C Printer	OKiPage 4W/OKiPage 4W
DeskJet 690C	ML320/ML321 Turbo
DeskJet 820C/830C/840C	ML590/ML591
DeskJet 1000C/CM Printer	
LaserJet 5L-PS	
LaserJet 6P/6M-PS	
LaserJet 350 (Printer/Fax/Copier/Scanner)	
EPSON	CANON
LX350	RJC-240
LX350+10/10+4	RJC-4200
FX-870/1170/2170	RJC-4550 (up to 11x17)
LQ-870/1170	RJC-620
DX3 5000+/8000	LBP-465 (Laser)
Stylus Color 200	C2500 (Fax, Scanner, Printer, Copier)
Stylus Color 500	
Stylus Pro (720dpi Microdot)	
Stylus 1500 (up to 17x22)	
Stylus Pro XL (720dpi Microdot, up to 17x22)	
Printer/Scanner/Printer/Scanner	
BROTHER	IFENMARK
HL-720 (Windows Only)	WinWriter 150C
HL-730 (Windows & DOS)	ColorJetPrinter 1020/2070
HL-760 (1200x600)	ColorJetPrinter 2050
HL-1060 (10ppm, 1200x600, dual bin)	2350/2391 Plus Dot Matrix Printer
MFC-6500 (thermal)	2350/2391 Plus Dot Matrix Printer
MFC-1950+ (ribbon)	4070 Plus
MFC-4550 (Laser)	4226 Dot Matrix
MFC-6550MC (Laser)	4039 10 Plus
MFC-7550MC (Laser)	Optra E
	Optra L/Optra+K
	Optra L/Optra Lano
	Optra C
	Optra N/Optra N w/16MB RAM
PANASONIC PRINTERS	
KX-P5000	
KX-P1150	
KX-P1124	
KX-P1130	
SuperScript H60 (Laser)	

*Price after manufacturer's mail-in rebate. Ask your salesperson for details!

Notebook Computers

IBM ThinkPad	AST Acentia Series
365XB, P100, 10.4" DS, 810MB, 4GB	J30 P100, 10.4" DS, ROOM 14.4
365X P133 11.3" Act 1GB	P30 P100, 10.4" Act, 810MB
365X P133 10.4" Act, 810MB	P30 P133, 10.4" Act, 810MB
365X P133 11.3" DS, 1.5GB	P30 P133, 10.4" Act, 810MB
760EL P120, 11.3" DS, 1.5GB	P30 P100, 11.3" DS, 1.2GB, 4X CD
760EL P133 12.1" Act 1.5GB	P50 P133 11.4" Act, 810MB, 4X CD
760E P150 12.1" Act 1.5GB	P50 P133 11.4" Act, 1.2GB, 4X CD
760EL P133 12.1" Act, 2.1GB, 4X CD	P50 P133 12.1" Act 1.0GB, 4X CD
	P50 P133 12.1" Act 2.1GB, 4X CD
	A41 P120 11.3" DS 1.0GB, 4X CD
	A41 P120 12.1" Act 1.0GB, 4X CD
NEC	OLIVETTI Echos
Verna 2400 P100 11.3" DS, 810MB	P100C P100 11.3" DS, 810MB, 1GB
Verna 2400CD, P100 11.3" DS, 1.0GB	P100E P100 10.4" Act, 810MB, 1GB
Verna 4250CD P133 11.3" DS, 1.0GB	P120E, P120, 11.3" Act, 810MB, 1GB
Verna 4250 P133 10.4" Act 1.0GB	P133S P133, 11.8" Act, 810MB, 1GB
Verna 6150SH P133, 12.1" SVGA 1.5GB	
Verna 6150SH P133 12.1" SVGA 1.5GB	

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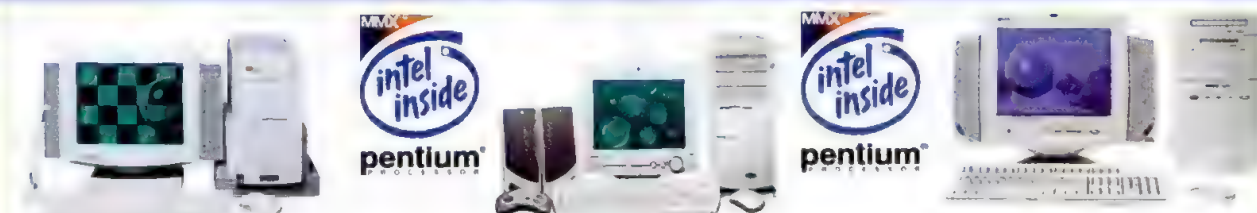
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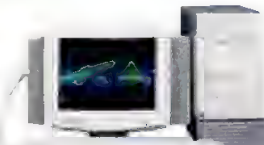


Packard Bell.

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- 14X MAX CD-ROM Drive
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1399⁹⁹

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5 Year Service Plan #105856 249.97

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9716 #147930

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- 16X MAX CD-ROM Drive
- 33.6/14.4 Data/Fax Modem
- 2 MB Video RAM



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15" XV15+ 28 NI Monitor (13.8" Viewable Image Size) #117002 399.99
3 Year Service Plan #304101 249.97
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120 MHz Pentium® Processor Multimedia Color Notebook

N120D #147012

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- Software Includes Windows®95, Netscape Navigator and Lotus® Organizer (Some software is preloaded. Software manuals/diskettes not included.)



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1999⁹⁹

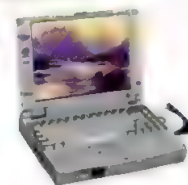
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2999⁹⁹

3 Year Service Plan #304154 279.97
5 Year Service Plan #105862 429.97
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5 Year Screen Damage Protection #139464 249.97

Computers

Compaq 4160 P150 16 MB RAM/2.1 GIG HD, 33.6/14.4 Data/Fax Modem, 8X CD-ROM Drive #147472 1299⁹⁹

Packard Bell E156 P150 32 MB RAM/3.2 GIG HD, 33.6/14.4 Data/Fax Modem, 14X CD-ROM Drive, Zip Drive #147465 1599⁹⁹

NEC 9710 P166 MMX™ 16 MB RAM/2.1 GIG HD, 33.6/14.4 Data/Fax Modem, 8X CD-ROM Drive #148561 1799⁹⁹

Compaq 4764 P166 MMX™ 24 MB RAM/2.5 GIG HD, 33.6/14.4 Data/Fax Modem, 16X MAX CD-ROM Drive #147475 1799⁹⁹

NEC 9712 P166 MMX™ 32 MB RAM/3.2 GIG HD, 33.6/14.4 Data/Fax Modem, 16X MAX CD-ROM Drive #147929 1999⁹⁹

Packard Bell PLT 2240 P200 MMX™ 32 MB RAM/3.2 GIG HD, 33.6/14.4 Data/Fax Modem, 16X MAX CD-ROM Drive #147468 1999⁹⁹

Toshiba 7201 P200 MMX™ 32 MB RAM/3.0 GIG HD, 33.6/14.4 Data/Fax Modem, 12X CD-ROM Drive #148041 2299⁹⁹

Laser Printers

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HP Laserjet 5LXra Printer #131887 399⁹⁹

HP Laserjet 6P Printer #139426 799⁹⁹

Inkjet Printers

Canon BJC 240 Photo #148906 179⁹⁹

HP Deskjet 400 Printer #133496 179⁹⁹

Epson Stylus 400 #149338 229⁹⁹

Epson Stylus 600 #149337 299⁹⁹

Canon BJC 620 #136590 399⁹⁹

Epson Stylus 800 #149336 449⁹⁹

Canon BJC 4550 #136594 499⁹⁹

Notebooks

Toshiba 205CDS P100 8 MB RAM/810 MB HD, 11.3" Dual-Scan Screen, 6X CD-ROM Drive #142282 1599⁹⁹

Hitachi E133DN P133 16 MB RAM/1.0 GIG HD, 11.3" Dual-Scan Screen #117457 1799⁹⁹

Toshiba 435 CDS P120 16 MB RAM/1.2 GIG HD, 11.3" Dual-Scan Screen, 10X CD-ROM Drive #144418 1999⁹⁹

Compaq Presario 1070 P133 16 MB RAM/1.08 GIG HD, 10X CD-ROM Drive, 33.6/14.4 Data/Fax Modem, 12.1" Dual-Scan Screen #148181 2899⁹⁹

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Targus Universal #892001 69⁹⁹

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Targus Business Traveler #898345 229⁹⁹

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3Com EtherLink III 10BT #110135 139⁹⁹

Eiger 33.6 #136609 189⁹⁹

Hayes Optima 33.6 #143617 239⁹⁹

Megahertz 33.6 Cellular Ready #141328 269⁹⁹

Xircom Credit Card 33.6 + 10BT #141674 359⁹⁹

Megahertz 33.6 + 10BT #147638 369⁹⁹

Networking

DLink Combo Ethernet Card #140976 29⁹⁹

Linksys PCI Combo Ethernet Card #142171 49⁹⁹

Linksys 5-Port TP Hub #110155 69⁹⁹

SMC EtherEZ TP #131893 99⁹⁹

3Com EtherLink III TP Only #105468 99⁹⁹

3Com EtherLink III Combo, TP, BNC #147427 119⁹⁹

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WinDelete 3 Windows®95/3.1 CD 3.5" #129947	23 ⁹⁹
First Aid 97 Windows®95 #147904	25 ⁹⁹
Zip Windows®95/3.1 3.5" #130680	25 ⁹⁹
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Publishing/Graphics

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Software

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ACT 3.0 Windows®3.5" #130107	169 ⁹⁹

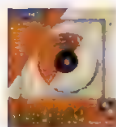
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Corel WP Office Pro Upgrade Windows®95** #135096	199 ⁹⁹
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After Rebate	179 ⁹⁹
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Toshiba 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000	486mg/168mg/32mg	486mg/168mg/32mg	80/179/209/121/209
Toshiba 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000	486mg/168mg/32mg	486mg/168mg/32mg	80/179/209/121/209
Toshiba 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000	486mg/168mg/32mg	486mg/168mg/32mg	80/179/209/121/209
Toshiba 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000	486mg/168mg/32mg	486mg/168mg/32mg	80/179/209/121/209
Toshiba 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000	486mg/168mg/32mg	486mg/168mg/32mg	80/179/209/121/209
Toshiba 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000	486mg/168mg/32mg	486mg/168mg/32mg	80/179/209/121/209
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Toshiba 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000	486mg/168mg/32mg	486mg/168mg/32mg	80/179/209/121/209
Toshiba 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000	486mg/168mg/32mg	486mg/168mg/32mg	80/179/209/121/209
Toshiba 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000	486mg/168mg/32mg	486mg/168mg/32mg	80/179/209/121/209
Toshiba 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000	486mg/168mg/32mg	486mg/168mg/32mg	80/179/209/121/209
Toshiba 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000	486mg/168mg/32mg	486mg/168mg/32mg	80/179/209/121/209
Toshiba 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000	486mg/168mg/32mg	486mg/168mg/32mg	80/179/209/121/209
Toshiba 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000	486mg/168mg/32mg	486mg/168mg/32mg	80/179/209/121/209
Toshiba 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000	486mg/168mg/32mg	486mg/168mg/32mg	80/179/209/121/209
Toshiba 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000	486mg/168mg/32mg	486mg/168mg/32mg	80/179/209/121/209
Toshiba 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000	486mg/168mg/32mg	486mg/168mg/32mg	80/179/209/121/209
Toshiba 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000	486mg/168mg/32mg	486mg/168mg/32mg	80/179/209/121/209
Toshiba 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000	486mg/168mg/32mg	486mg/168mg/32mg	80/179/209/121/209
Toshiba 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000	486mg/168mg/32mg	486mg/168mg/32mg	80/179/209/121/209
Toshiba 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000	486mg/168mg/32mg	486mg/168mg/32mg	80/179/209/121/209
Toshiba 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000	486mg/168mg/32mg	486mg/168mg/32mg	80/179/209/121/209
Toshiba 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000	486mg/168mg/32mg	486mg/168mg/32mg	80/179/209/121/209
Toshiba 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000	486mg/168mg/32mg	486mg/168mg/32mg	80/179/209/121/209
Toshiba 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000	486mg/168mg/32mg	486mg/168mg/32mg	80/179/209/121/209
Toshiba 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000	486mg/168mg/32mg	486mg/168mg/32mg	80/179/209/121/209
Toshiba 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000	486mg/168mg/32mg	486mg/168mg/32mg	80/179/209/121/209
Toshiba 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000	486mg/168mg/32mg	486mg/168mg/32mg	80/179/209/121/209
Toshiba 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000	486mg/168mg/32mg	486mg/168mg/32mg	80/179/209/121/209
Toshiba 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000	486mg/168mg/32mg	486mg/168mg/32mg	80/179/209/121/209
Toshiba 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000	486mg/168mg/32mg	486mg/168mg/32mg	80/179/209/121/209
Toshiba 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000	486mg/168mg/32mg	486mg/168mg/32mg	80/179/209/121/209
Toshiba 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000	486mg/168mg/32mg	486mg/168mg/32mg	80/179/209/121/209
Toshiba 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000	486mg/168mg/32mg	486mg/168mg/32mg	80/179/209/121/209
Toshiba 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000	486mg/168mg/32mg	486mg/168mg/32mg	80/179/209/121/209
Toshiba 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000	486mg/168mg/32mg	486mg/168mg/32mg	80/179/209/121/209
Toshiba 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000	486mg/168mg/32mg	486mg/168mg/32mg	80/179/209/121/209
Toshiba 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000	486mg/168mg/32mg	486mg/168mg/32mg	80/179/209/121/209
Toshiba 710 720 730 740 750 760 770 780 790 800 810 820 830 840 850 860 870 880 890 900 910 920 930 940 950 960 970 980 990 1000	486mg/168mg/32mg	486mg/168mg/32mg	80/179/209/121/209
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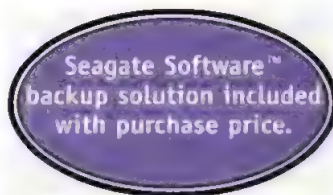
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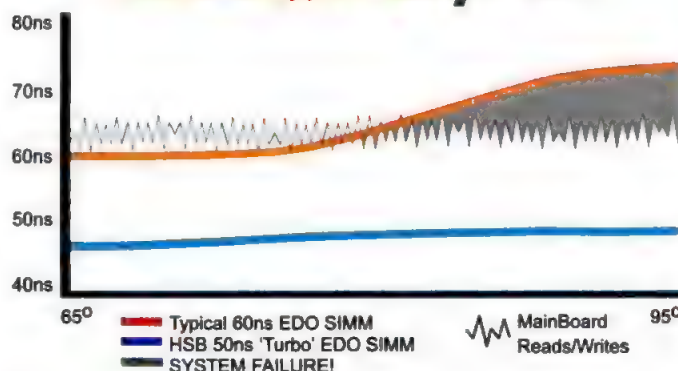
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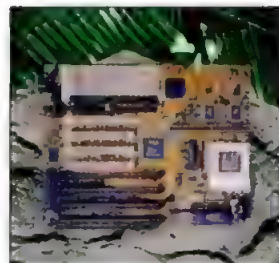
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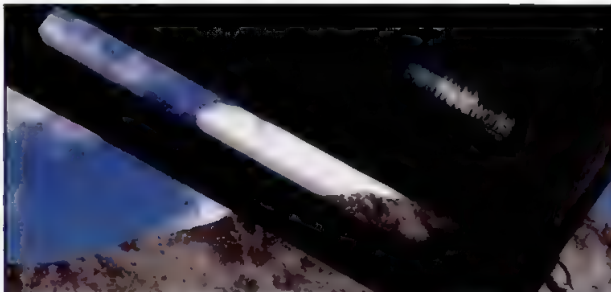
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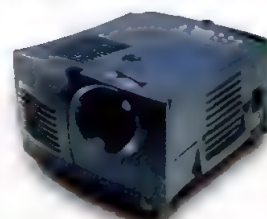


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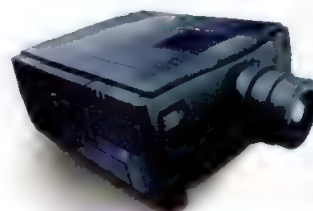
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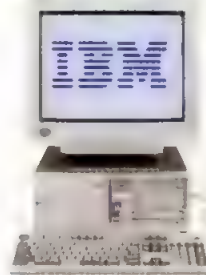
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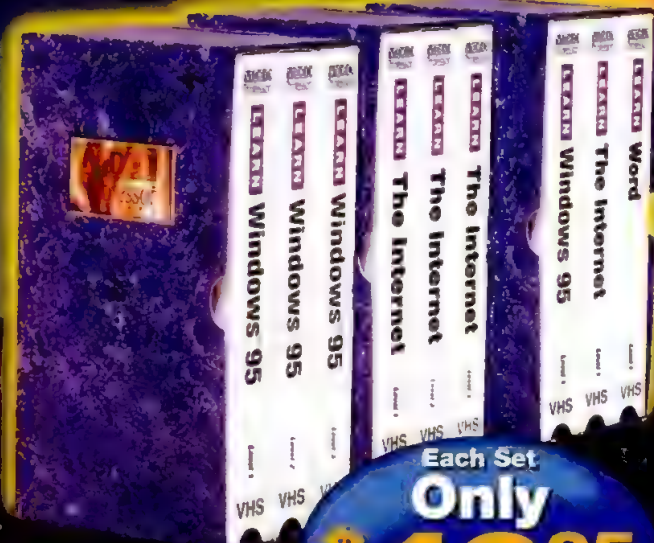
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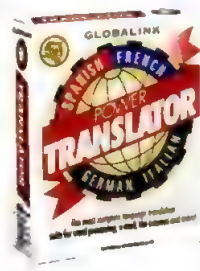
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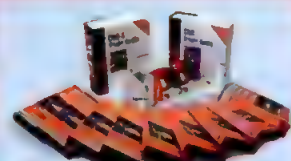
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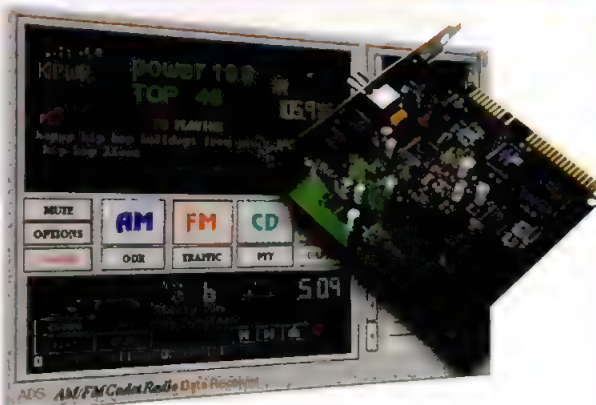
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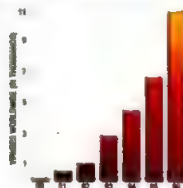
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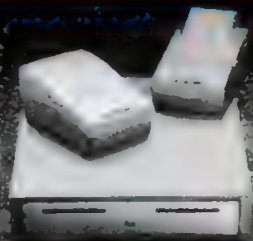
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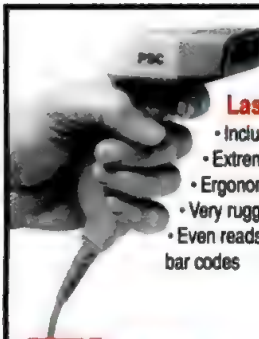
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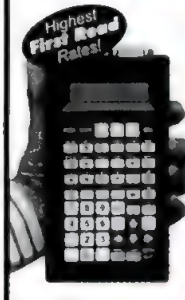
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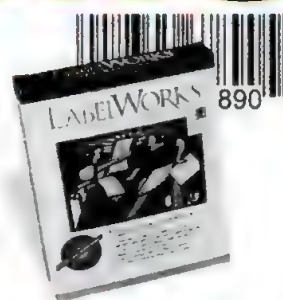
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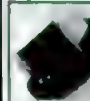
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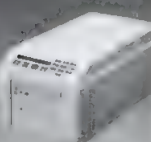
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PC Magazine is published 22 times a year, bi-monthly except for July and August. The BusinessCard closing is approximately two months prior to issue date.

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After Hours

PRODUCTS FOR THE LEISURE SIDE OF PERSONAL COMPUTING

Choose Your Fate

Origin's game of galactic freebooting gets a facelift and offers more open-ended action.

Privateer 2: The Darkening

When Origin Systems released the original Privateer in 1993, space action fans were ecstatic. Here was a game that allowed players to

better with 8MB of RAM, but we recommend at least a Pentium/133 with 16MB RAM.

Though much of Privateer 2's charm is in its free-form design, there is a story to the



choose their own path through the rich Wing Commander universe. Of course, this was before Origin redesigned the Wing Commander space-flight engine, revamped the graphics, and began using live-action footage for the cinematic sequences.

Enter Privateer 2: The Darkening, a sequel with even more free-form action than the original, plus all the bells and whistles of the most recent Wing Commander titles. Privateer 2 is an MS-DOS game and requires a Pentium/75 or

game—one that you can follow at your leisure or completely ignore. As you start the game, you discover that you are the sole survivor of a ship that crashed into the planet Crius. How you survived is a mystery and the jumping-off point for the main plot of a story that eventually unfolds as one of a deep-seated vendetta. If you choose to follow the plot, be forewarned that the game gets rather difficult and the eventual conclusion is somewhat anticlimactic.

Whether you follow or ignore the plot, you will have to earn your keep in the game as a merchant, a bounty hunter, or both. With the money you pull in from various missions and cargo runs, you can buy better, more powerful ships (you have 18 to choose from) and weaponry.

The game's mercantile features are a bit meager: You can trade in 35 commodities at 24 planets and space stations, hiring cargo ships to carry your haul. But the market is unexciting and predictable. Privateer 2 was clearly designed with lots of combat in mind.

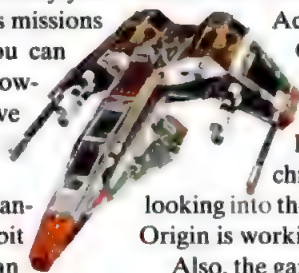
Fortunately, Privateer 2's space-flight engine is the best we've seen to date (though LucasArts' forthcoming X-Wing Vs. TIE Fighter should give it a run for its money). The graphics and effects are more impressive than those in Wing Commander IV, and you really get a sense that the combat is taking place in a 3-D space. Also, the game environment is dynamic enough that you will often stumble across pitched battles in deep space between computer-controlled forces. Remember to hire wingmen, however, because the combat can be overwhelming at times.

Some things to watch out for: As we went to press, the game did not work with any graphics card based on the Rendition Verite 1000 chip.

According to Origin, this was caused by a BIOS problem on the chip. Rendition is looking into the problem, and Origin is working on a patch.

Also, the game occasionally crashes under DOS 6.22, and the enemy artificial intelligence is not always intelligent (enemy ships often run right into you before maneuvering). Finally, the cinematic sequences are for the most part not very good, the theme for most being "In the future, everything will be weird."

But the game's open-ended space combat makes up for most of these flaws and should provide space-action fans with



hundreds of hours of game play.—Michael E. Ryan

IN AFTER HOURS

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Space is the Place

This pair of astronomy titles can help you find your way among the stars.

Solar System Explorer

Even before Neil Armstrong stepped onto the moon, people dreamed of traveling through space. Thanks to Solar System Explorer from Maris Multimedia, you now can get a reasonable idea of what such travel would be like. Although it isn't perfect, this CD should satisfy those fascinated by the wonders of space.

Solar System Explorer runs



on Microsoft Windows 3.x and Windows 95, as well as on Apple Macintosh computers. The interface is designed to look like the inside of a spaceship with five stations: the bridge, the navigation room, the library, the probe room, and the museum.

The navigation room is where you create your missions and tell the program where in the solar system you want to go. For example, you can program a trip from Earth to Mercury with a flyby of Venus. The bridge is where you launch your mission, view it, and control the speed and orbits. Though it's fun to view your mission's

progress here, we found the frame rate rather slow in spots.

The library has films, photos, and information for each planet. The probe room lets you send a probe down to a planet, where it will send back pictures and information to you. The museum provides a gallery of information on mankind's past successes and failures in space exploration.

The title also offers some on-line hooks that take you to the Maris Web site for semicurrent astronomy news. The quality of this information runs hot and cold. Although some topics were covered in great detail, with plenty of information, interactive demos, and fine video, information on other topics seemed to be a bit thin.

But for those who feel that their calling is to pilot the next space shuttle, using Solar System Explorer should prove a good vehicle for exploring that dream.—*Shane Mooney*

SkyMap 3.1

Whether you're inspired by Greek mythology or the science of the cosmos, SkyMap 3.1, from Jasc Software, will help you find the stars you're looking for.

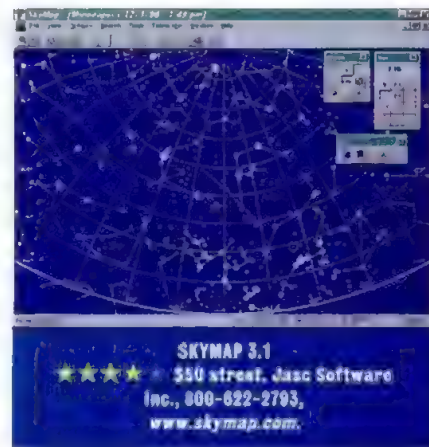
This planetarium program for Microsoft Windows 95 and Windows NT draws two types of star atlases with great precision. The horizon map takes the observer's position into account, while the area map fo-

cuses on one portion of the sky.

SkyMap is for beginning stargazers and veterans alike. Simply enter your location (if you don't know your exact longitude and latitude, don't worry—SkyMap provides an extensive list of major cities), any date between 4000 B.C. and A.D. 8000, and a time (in hours, minutes, and seconds).

The maps offer an easy-to-read representation of the sky, including stars sized by brightness, lines connecting stars in a constellation to form identifiable stick figures, and labels for planets, distant nebulae, and galaxy clusters.

With the Smithsonian Astrophysical Observatory catalog of 259,000 stars, SkyMap provides enough data to satisfy even serious amateurs. The program contains editable databases of comets and aster-



oids. You can even use it to control the Meade LX-200 telescope through a serial port.

SkyMap gets the most out of the Windows 95 interface with iconic toolbars, floating palettes, and right-mouse button menus.

If you're still not convinced about the value of SkyMap, download a 30-day evaluation copy from Jasc (www.skymap.com). You'll be glad you did.—*Luisa Simone*

QUICK CLIPS



Lionel: A Collector's Guide and History CD-ROM—Postwar

Not the most refined of reference titles, but this compilation of Lionel model-train information is sure to please collectors. Some interesting old pictures, ads, and video clips along with data on over 1,300 items make this a solid collectors' tool. \$59.95 list, Prairie Multimedia Inc., 800-764-5010.



M.A.X.

An intriguing real-time strategy that reminds us of the best qualities in both Command & Conquer and Warcraft II. High production values and extensive game-play options should help M.A.X. carve its own niche. \$49.95 list, Interplay Productions Inc., 800-468-3775.



Carrier: Fortress at Sea

This companion CD-ROM for the TV documentary of the same name contains tons of information about aircraft carriers. It's too bad that crashes and interface idiosyncrasies keep you from accessing most of it. \$39.95 list, Discovery Channel Multimedia, 800-889-9950.



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The Feel of Control

CH Products' new joystick adds a little shake, rattle, and roll to gaming.

Force FX

A joystick that shakes in response to events in a computer game? If you're like us, you're probably a little doubtful about this idea and its usefulness. But after testing the CH Products Force FX joystick, we quickly became believers.

In use, the Force FX is a good joystick with some very cool features. Through support for Immersion Corp.'s I-Force protocol, the Force FX can take input from a game and translate it into effects the player can feel—a process known as force feedback. Force feedback effects range from simple

jolts to increased resistance in a specific direction or temporary unresponsiveness.

We tested the Force FX with Electronic Arts' Need for Speed SE and Philips Media's Fighter Duel SE, two of eight games currently supporting I-Force (several more such games are currently in development). Though we had some difficulty driving a car with a joystick, we enjoyed using the Force FX with The Need for Speed SE. We felt bumps from other cars and the resistance on the stick increase as we accelerated. Fighter Duel SE provided less spectacular feedback, but we did

feel jolts when enemy planes strafed us. Also, after playing these games only briefly, we noticed our arms were getting quite a workout.

The Force FX is an imposing presence. The handle is the same as that on CH's F-16 CombatStick, with five buttons and two hat switches. The base, on the other hand, is considerably larger (9.5 inches square, 3 inches high), and the whole thing weighs in at a beefy four pounds. Another beefy item is the street price, which is \$180.

The Force FX can be a pain to install on some systems. You have to connect the joystick to a game port, an AC outlet, and a serial port. Our first test system used both a serial mouse and an external

modem, so we didn't have a free serial port for the joystick. But on a system with a PS/2 mouse, we installed the Force FX without difficulty.



FORCE FX
★★★ \$180 street, CH Products,
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Despite our initial doubts, we were quite impressed with the Force FX. With a lower price, a smaller base, and wider game support, it could become a must-have for game players.—MER

PHOTOGRAPH BY THOM D'CONNOR

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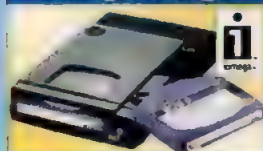


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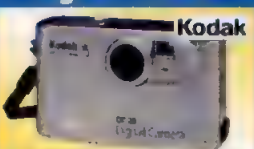
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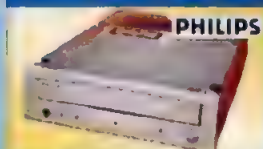
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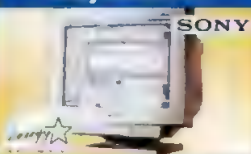
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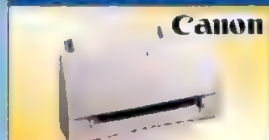
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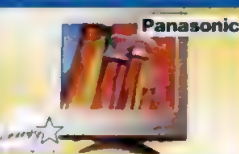
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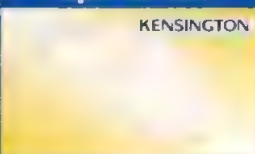
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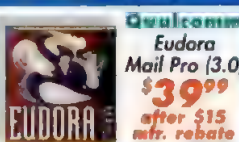


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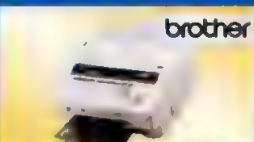
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Hoop Dreams?

Electronic Arts' basketball game gets new graphics, new features, and Shaq.

NBA Live 97

Building on a strong 1996 version, NBA Live 97 has a much-improved look and new multiplayer options. Despite a few flaws, the revamped game retains its crown as king of PC basketball games.

NBA Live 97 from Electronic Arts' EA Sports runs on MS-DOS and Microsoft Windows 95 (the CD-ROM includes two separate versions of the game). According to the box, the game requires a Pentium/75 with 16MB of RAM. It was sluggish, however, on a Pentium/90 in both MS-DOS



and Windows 95, so we recommend at least a Pentium/120.

Like NHL 97, NBA Live 97 now sports a 3-D polygon-

based graphics engine. But although the player graphics are better than those in any other basketball game, they are not as good as in NHL 97. Little things, such as the fact that every single player seems to have a mustache, detract from

the otherwise impressive 3-D graphics. Also, if EA Sports is to be believed, NBA players almost always dunk backwards.

The game includes over 300 real players, including Shaquille O'Neal, who along with Michael Jordan and Charles Barkley had been missing in previous versions because of licensing problems (Jordan and Barkley are still absent). You can sign and release free

agents, and you hold absolute power over player trades.

In addition to single-player games against the computer, NBA Live 97 can be played head-to-head via modem, direct serial, or IPX network. If you have the Gravis GriP controller on both computers, up to eight players can take part.

We enjoyed NBA Live 97's game play but were annoyed by the fact that it is nigh impossible to dunk. Even when your player is wide open right in front of the basket, he'll more than likely do a lay up or jump shot. Also, when your computer-controlled teammates grab a rebound, they invariably sail right out of bounds with it.

Yet even with its annoyances and idiosyncrasies, NBA Live 97 is fun and remains the best basketball game available for PCs.—MER

Three and Out

Sierra's perennial football powerhouse is a contender, not a champion.

Front Page Sports: Football Pro '97 Season

When a game is updated every year, you might assume that it would improve each time. But this year, Sierra On-Line's Front Page Sports: Football Pro '97 Season has actually gotten worse.

A few years ago, Football Pro '93 Season set the standard by which all PC football games were to be measured. It offered realistic graphics, a surprisingly good statistical model, and a robust management system that let you run your team as a real owner and coach would.

All this was revolutionary four years ago, but with each new edition of Football Pro, the title's weaknesses become

more obvious. The real improvements in this year's edition can be counted on one hand: The players' jerseys now have numbers on them, and you can play the game over modem and network links—but the multiplayer support rarely works without crashing.

The only other major improvement is that the game has been converted from MS-DOS to Microsoft Windows 95. Unfortunately, the game has become painfully slow as a result. And we tested on a Pentium/120 with 16MB of RAM—much faster than the game's minimum 486/DX2 66 with 8MB of RAM.

The product's real strength—statistics and management—are still better than



those in any other football game we've seen. As manager and coach, you can trade and draft players and create your own custom plays.

We also like the improved sound effects. The noise of players clashing on the field lends some great atmosphere.

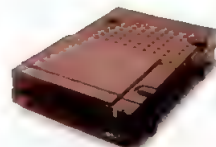
And the graphics, though slow, are still the best-looking currently available on the PC.

If you're a football fan but never owned a Football Pro title, this could be the game you're looking for. But if you're a Football Pro '96 user, don't bother upgrading.—SM

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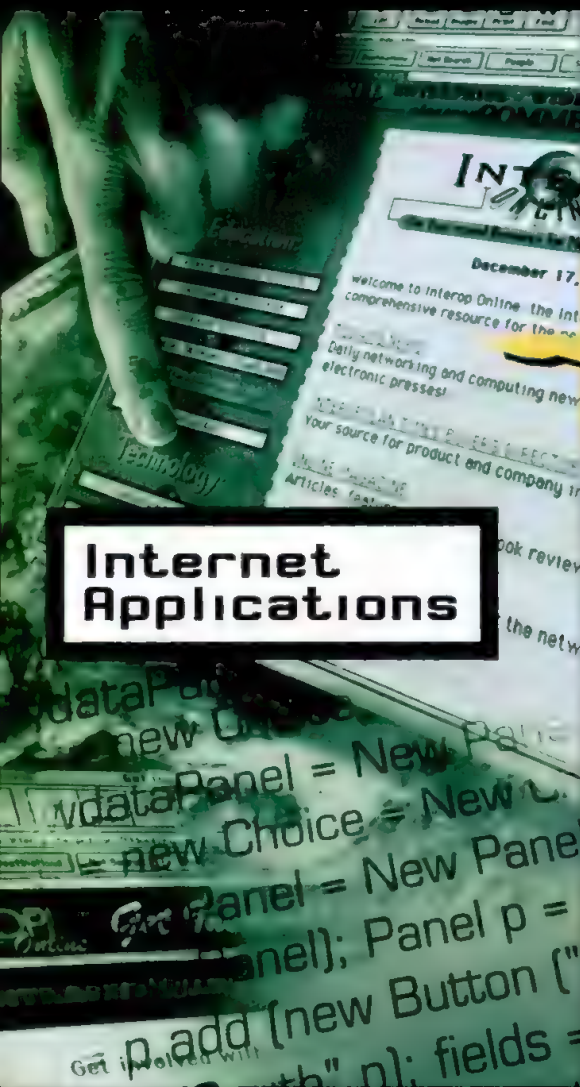
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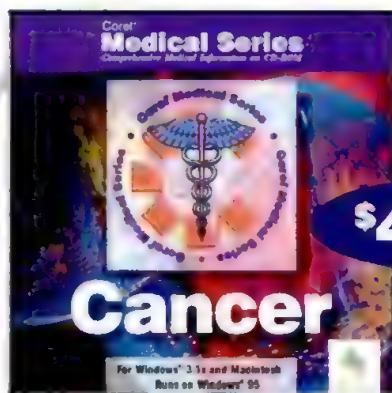
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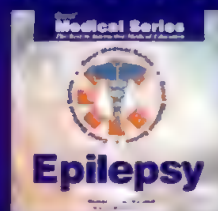
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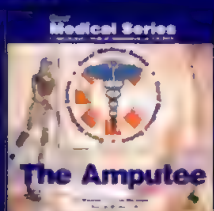
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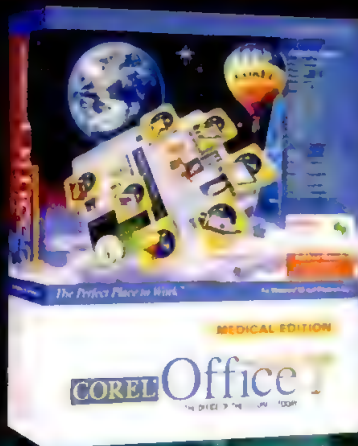
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Coming Up

What's in the Next Issue of *PC Magazine*

Graphics Software

Long-awaited and much-needed, our coverage of graphics professional software encompasses desktop publishing, image editing, and illustration packages. You'll find out just how the current versions of these products fare—whether you want to create a document, edit a photograph, or paint a picture. In a market where integration among the three categories has emerged as a key component, and in the era where the Internet has evolved as a primary content-provider, these products now attempt to address graphics professionals' latest needs.

Graphics Workstations

As more PC vendors introduce graphics workstations based on the Pentium Pro processor and Windows NT, this market, once dominated by RISC vendors, has heated up significantly. In this roundup, we put the Pentium Pro up against the Sun's SPARC, Silicon Graphics' MIPS, Digital's Alpha, and Power PC-based Macintosh clones to see how it stacks up. We test each machine with popular graphics-based applications including AVS, PVWave, PhotoShop, and Pro Engineer.



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NE—Network Edition.

For information about the Network Edition of *PC Magazine*, call Circulation at 800-289-0429.

Abort, Retry, Fail?

THE LIGHTER SIDE OF PERSONAL COMPUTING

By Don Willmott

Nothing like  a rebate to make customers feel good! (PCs Compleat ad.)



This Could Be a Rough Installation

"Installing Microsoft ODBC Drivers. Please wait. This may be a good time to fill out your registration card (or get something to drink)." —BARCODE ANYTHING LABEL INSTALL SCREEN

Dishwasher not  included. (Sun Super Savings Center ad.)

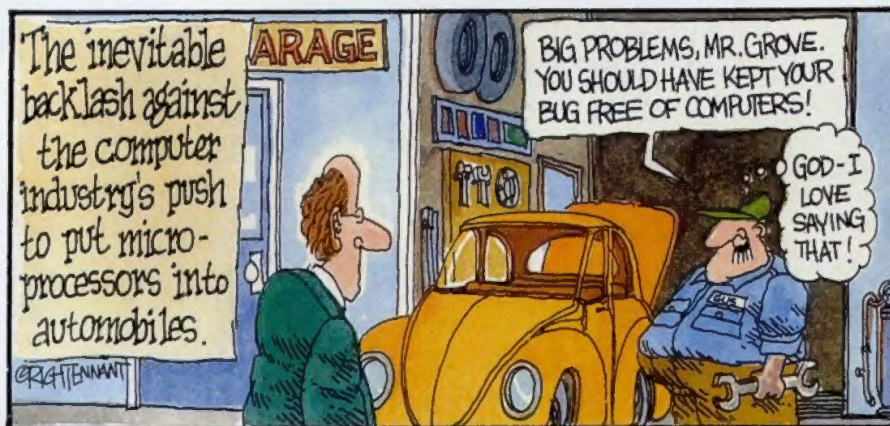
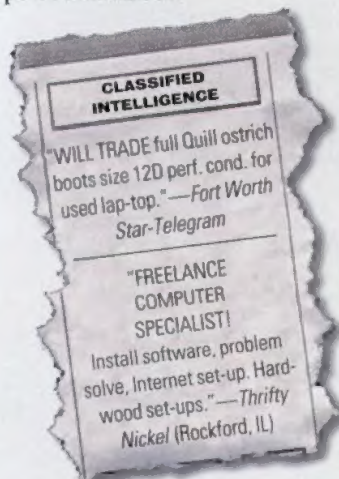
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• Stereo sound card • Self-cleaning oven Speakers

Tunderscoreaddoo@onctard.com

 File under "misunderstood e-mail addresses."

So That's How King Tut Died

An ad for PIE's new Powerslave says that the game takes you to "the darkness of ancient Egypt." Fine, and what do you do when you get there? "With just a machete to begin with, search for 6 other weapons like hand grenades, a flame thrower, an M60 machine gun and a magical cobra staff." Yowch! That's not the ancient Egypt we remember!



If your entry is used, we'll send you \$50 and a PC Magazine T-shirt. Send your entries to Abort, Retry, Fail?, PC Magazine, One Park Ave., New York, NY 10016-5802 or, via e-mail (text items only), to don_willmott@zd.com. Winners this issue: Thomas Caddoo, Jim Davis, Mike Johnson, Brett Kirby, David Rounds, Louis Schenfeld, and Susan Stadler.

RICHARD TENNANT

CAN YOU REALLY AFFORD TO BUY THE #2 NOTEBOOK?

ANNUAL GUIDE TO COMPUTERS

Laptops

TRAVELING COMPANIONS

Some Popular Pentium Notebooks

RANK	MANUFACTURER	MODEL/SCREEN	CONFIGURATION	COMMENTS
3.1	DELL COMPUTER	Latitude LM P133ST, 12-in. TFT display, (133 MHz)	6.5 lb, 1GB RAM, 810MB disk, 6X CD-ROM	Great
2.8	IBM PC CO.	ThinkPad 760ED 1, 2-in. TFT display (133 MHz)	1.7GB disk, 4X	
2.8	WINBOOK	WINBOOK 11.3		
2.7	COMPAQ	COMPAQ		
2.7	HEWLETT-PACKARD			

— Business Week
11/4/96

What's wrong with this picture? The notebook that gives you the most performance, usability and features costs half the price of notebooks that give you less. (Notebooks, by the way, that you probably thought gave you more.) And remember, you have this information on the very best authority. *Business Week*, the business publication, in their Second Annual Computer Buying Guide cited the Dell Latitude LM P133ST as "the top ranked machine in the tests" and the notebook they'd most like to travel with. So if you're shopping for a notebook, buy the best. After all, you can afford it.

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EDITORS' CHOICE AWARD - XPS P200s
EDITORS' CHOICE AWARD - XPS P133c

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MVP WORKHORSE DESKTOP - XPS P200s
4 STAR AWARD - XPS P200s
4 STAR AWARD - XPS Pro200n
BEST AWARD - XPS P166c
4 STAR AWARD - XPS P166c
4 STAR AWARD - P100t

★ PC WORLD

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5-time POWER DESKTOP BEST BUY - XPS Pro200n
HOME DESKTOP BEST BUY - P200v
BUDGET DESKTOP BEST BUY - P200v
BUDGET DESKTOP BEST BUY - P133v
5-time BUDGET DESKTOP BEST BUY - P75t
8-time POWER DESKTOP BEST BUY - XPS P133c
BUDGET DESKTOP BEST BUY - P100t
HOME DESKTOP BEST BUY - P100t
5-time BUDGET DESKTOP BEST BUY - XPS P120c
POWER DESKTOP BEST BUY - XPS P90c
BUDGET DESKTOP BEST BUY - XPS P90c
POWER DESKTOP BEST BUY - XPS P166c

★ WINDOWS MAGAZINE

5-time RECOMMENDED LIST - XPS Pro200n
WIN100 '96 HARDWARE AWARDS - XPS line
8-time RECOMMENDED LIST - XPS P166s
11-time RECOMMENDED LIST - P100t
2-time RECOMMENDED LIST - P200v
WIN100 '96 HARDWARE AWARDS - DIMENSION line
2-time RECOMMENDED LIST - XPS Pro200
3-time RECOMMENDED LIST - XPS P166c

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TOP 100 AWARD - XPS P166s

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